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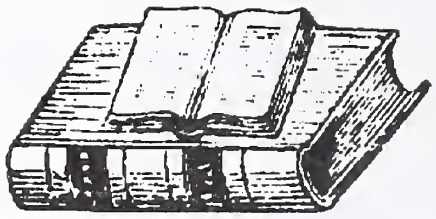

What Does the Dictionary Say?

The office bookcases of an ophthalmologist are not likely to carry a text on neonatal nutrition; nor, generally, will a book on molecular virology be found on the shelves of a psychiatrist's office. The world of medical information is too vast and too diversified to allow the average practitioner to own books representing every biomedical discipline. The personal library of each physician must necessarily be confined principally to the territory of his personal specialty. But one book is apt to be found in virtually every physician's library: a medical dictionary.

Dictionaries [from the Latin, *dictionarium,* meaning a book of sayings] are historically recent contrivances answering a pressing need for a list of equivalents between Latin and one of the Latin-based vernaculars. The first Latin-to-English dictionary, *"Promptorium Parvulorum,"* was completed in 1440. The first dictionary offering English equivalents to English words, however, did not appear until Bailey's dictionary of 1730. This limited text selected words deemed to be unfamiliar while avoiding those in the current idiom. Its aim was to provide a vocabulary of "good" words. This effort to defend the English language from the corrupting influences of innovation was somewhat similar to parallel 18th century attempts to standardize Italian and French, under the naive assumption that a mature language need no longer expand its inventory of words nor modify previously established meanings. The authoritative dictionary, thought Ambrose Bierce, was "A malevolent literary device for cramping the growth of a language and making it hard and inelastic."

In the centuries before the advent of printing, in the morning of modern English, these bilingual glossaries were narrowly confined to scriptural vocabulary and phraseology. They operated more as vehicles for translation than as resources for word-definition, and rarely did they offer meanings, pronunciation guides or word-derivations. Some of these earlier dictionaries also offered translations of basic phrases and sentences from one language to another, a precursor of the modern tourist's phrase book. Only belatedly did they offer synonyms or paraphrasings *in the same language.* Gradually, as the populace became more literate, the dictionary broadened its mission; and depending on its content or avowed purpose, it was then variously called a glossary, concordance, vocabulary, gazetteer, lexicon, bibliography, or even encyclopedia.

The first English language dictionary which attempted an exhaustive review of all known English words, regardless of their social status, was Samuel Johnson's 1755 dictionary. Johnson, while accepting the majesty of 18th century English, did not believe that the natural evolution of a living language could be arrested and he therefore proposed that his great reference work undergo periodic revision. The lexicographer, in his opinion, should be an historian, not a critic. Dictionaries which followed the Johnson work, particularly the great dictionary assembled by Noah Webster, also incorporated elements of street jargon as well as words from foreign tongues newly absorbed into English. The most definitive English language dictionary, however, began as a challenging proposal by Bishop James Trench in 1857 but was not actively begun until 1878. It was a massive scholarly enterprise requiring, at its onset, the collective labors of 1,300 readers and editors amassing over three million quotations from the body of English literature beginning with works from the 12th century. The task, supervised by the Oxford Press, ultimately ran to ten huge volumes, some 16,464 pages, and was not completed until 1928.

The function of the modern medical dictionary is substantially more modest. It furnishes meaning to a limited compendium of technical words expressed through synonyms, diagrams, paraphrasings, charts, metaphors and quotations. The typical medical dictionary defines only about 35,000 terms. [Webster's Third Edition, in contrast, defines some 450,000 words and requires, for each new edition, an estimated 757 editor-years.]

The medical dictionary thus answers an immediate demand for a precise definition of some word or phrase, but in some cases it will also provide alternative meanings thereby illustrating the inevitable ambiguities and nuances of all vocabularies, scientific or otherwise.

Dictionaries, medical or nonmedical, yield their information by one of the cleverest of manoeuvers: Instead of haphazard or even categorical clustering, the words are ingeniously ordered in an alphabetical array. The time-saving is immense: Were the names randomly entered in a telephone directory, a kind of dictionary with some 800,000 separate entries, it would take weeks or more to locate a sought-after number. With alphabetic organization a successful search rarely requires more than 30 seconds. A physician may therefore seek out the meaning of some technical word in an alphabetized medical dictionary without having to undertake a sabbatical leave.

A medical dictionary also regularizes technical spelling thus eliminating a prime source of confusion when scientists attempt to communicate in writing with each other. [There are, of course, some medical students who do not recognize the merit of such conformity in spelling, regarding it as a form of pedantic despotism. Some permissive

spellers amongst them have even declared that knowing but one way to spell a word is clear evidence of mental impairment.] In recognition of the critical need for an orthography which transcends regional languages, the International Congress of Anatomists periodically meets to revise its *Nomina Anatomica*.

While a medical dictionary hopes to be authoritative, it nonetheless realizes that its obsolescence begins on the day of its publication. It recognizes the inevitability of new words arising, unused words dying and new meanings being given to obsolete words; and it attempts therefore to strike a balance between a defense of high philologic standards and a linguistic permissiveness. Finally, by providing an etymologic glossary, a good medical dictionary allows the readers to readily understand newly minted technical words since the meanings of the component roots, suffixes and prefixes are made available.

Most physicians' libraries are also blessed with a general dictionary; and whether it is used to clarify a definition, adjudicate a Scrabble dispute, answer a crossword puzzle question or merely enlarge one's understanding of English, the book fulfills a useful, perhaps even noble, function. Each excursion into the book becomes a serendipitous adventure; inevitably one's eyes dwell on other words, familiar and unfamiliar, while seeking out the object of the original search.

The faithful dictionaries sit quietly on some accessible shelf awaiting the call: "What does Webster [or its medical counterpart] say ?" And after consulting the dictionary, other questions inevitably arise such as "Is the definition a true one ?" This is really a pointless question. Rather, it should be worded: " Is this definition consistent with how the word is generally interpreted today ? Is the interpreted meaning concordant with the intended meaning ? When I use the word, and you read the word, are we thinking about the same thing ? Are we, in essence, talking the same language ?" The dictionary, imperfect and outdated as it inevitably is, nevertheless acts as our intermediary in the delicate process of effective interpersonal communication. "Dictionaries are like watches:" Samuel Johnson said, "the worst is better than none, and the best cannot be expected to go quite right."

– Stanley M. Aronson, MD

Moon for the Misbegotten

The lunatic, the lover and the poet, thought Shakespeare, were kindred souls. He was, of course, referring to their shared frenzy, their febrile imaginations and their habit of seeing things not visible to others. Lunacy [from the Latin, *luna,* related to the moon] has frequently been linked to the moon and its cycles. Milton, too, talks of "Demoniac frenzy, moping melancholy and moonstruck madness," thus suggesting again that fragile sanity is somehow imperilled by the cold rays of the moon. Othello declares that when the moon comes near the earth, she "makes men mad" thus proposing that excessive exposure or undue proximity to the moon causes sane men to give up their sanity.

Lunacy was historically construed as but one of many varieties of insanity. Early English law distinguished between idiocy - a mental incompetency beginning in early childhood - and lunacy, a mental unsoundness arising in adult life. During the reign of Henry VIII, a Commission of Lunacy was established. When by writ an individual was declared to be a lunatic, he lost his autonomy and became a ward of the king [*De prerogativa regis*], his liberty restricted, and his tangible property absorbed by the crown. Contracts entered into by a certified lunatic were declared void including the contract of marriage even if entered into during a lucid interval.

By the 17th century lunacy was defined as a "distemper which followeth the course of the moon," reinforcing the conviction first that lunacy was an intermittent rather than a seamless form of mental derangement; and second that it was subject to the specific influence of some outside power such as the waxing and waning of the moon.

Were this alleged conjunction between the moon and earthbound madness merely a British eccentricity, it might deserve no more than a small footnote in history books. But, in truth, the belief in this causal relationship is found in virtually every culture as well as in myths and customs extending back through history.

Of the many cyclic phenomena beyond man's touch but within his sight, surely the sun was the most influential. It brought warmth and some agenda into the chaos of a savage existence. It informed men when to plant, when to undertake seasonal migrations; and eventually, it served as a celestial marker through visible equinoxes and solstices signifying a regularity of the solar orbit. It was the heavenly guide for the sailor and merchant undertaking perilous voyages. But in some ways the moon was no less important in touching man's primitive existence. Despite famine, pestilence

and war, never in the memory of man had the dependable moon ever deviated from its 28 day cycle of birth and death. It is not surprising then that the moon rather than the sun or stars provided man with his first objective criterion for the passage of time. Many more cultures than those of the Native Americans measured time, and made future appointments, by indicating "the number of moons" to be awaited.

In night skies not yet obscured by neon lighting, man could stare at the moon, watch its transits across the skies, see it diminish to a faintly visible sliver and then disappear for three moonless nights only to return with awesome regularity. Surely an entity such as this - so visible, so dependable, so powerful, so involved in birth, death and resurrection - must hold dominion over the fortunes and lives of humans.

In most primitive mythologies the moon was symbolic of fertility and barrenness, of tidal comings and goings, of life's many fundamental rhythms such as menstruation [from the Latin, *mensis*, meaning a month]. Moonlight also reigned over evil spirits, necromancy, moistness, darkness - and madness. In the eyes of the unskeptical peasant, the moon was but a jealous reflection of the sun, capable of exerting power only when the sun was down. To primitive people, the moon was therefore a female icon, the wife of the sun and the mother of the stars. The many dieties assigned to the moon [Hecate, Diana, Isis, Ishtar, Artemis] have ever been female.

The moonlit night was a time for the moonstruck to walk aimlessly [lunambulism]; for the melancholic to moon over lost opportunities; it was a time in Greek mythology when the dead arose, guided by Hecate to their celestial destination; it was a time when those of fragile temperament might become mad through the baleful influence of the moon; it was a time for malevolent creatures such as vampires to wander unhindered by sunlight; it was a time, according to many, when latent manias came to the fore, especially when the moon was full; and it was a time when logic was ignored, when all manner of folk cures were undertaken - which, if pursued in broad daylight, would surely have appalled even the most credulous. But yet it was also the time for innocent spirits like Tinker Bell to be born of guileless moonbeams.

And this full moon [a circumambulatory aphrodisiac, according to Fry] continues to encourage youthful romance. A suitor, "by yonder blessed moon," might have sworn his deathless love; while the young woman of his desires would have expressed deep skepticism of such lunar pledges, responding: "Swear not by the moon, the inconstant moon." The ultimately tragic fate of these two Veronese inamoratas, however, has not dissuaded successive generations of young lovers from intertwining moonbeams with hormones to yield yet another form of benevolent lunacy.

– Stanley M. Aronson, MD

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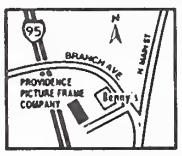

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Sarcoma: A Challenging Frontier for the Oncologist

Harold J. Wanebo, MD

The Greek word *sarkoma* means a fleshy growth and well describes the malignant soft- tissue tumors that commonly arise in connective tissue of mesoderm origin. Approximately 6400 new cases of soft-tissue sarcoma will be identified nationwide, with 3700 deaths from this disease in 1996.

There is no proven genetic predisposition to the development of soft-tissue tumors, although the Li and Fraumeni syndrome included 4 kindreds with pairs of young children with soft-tissues sarcomas.[1,5] Patients with genetically transmitted disease such as basal cell nevus syndrome, tuberous sclerosis, Werner's syndrome, intestinal polyposis, Gardner's syndrome[2-7,17-21] show some increase in the occurrence of soft-tissue sarcomas. Patients with multiple neurofibromatosis (von Recklinghausen's disease) have a 15% chance of developing neurofibrosarcoma. Neurofibromatosis, a component of von Recklinghausen's disease, is an autosomal dominant disorder.[8-17] About 10-15% of von Recklinghausen's disease patients may develop malignant schwannomas arising in benign, superficial neurofibromas. Chemically induced soft-sarcomas from carcinogens such as 3-methylcholanthrene have been demonstrated in animals, but not convincingly in humans. A study in Sweden (1979 and 1981) suggested environmental exposure to phenosxyacetic acids and chlorophenols (wood preservatives) cause a sixfold increase in soft-tissue sarcoma incidence, but a larger study failed to confirm these results. The study of Vietnam veterans exposed to Agent Orange, a mixture of two phenoxyacetic acid herbicides with traces of dioxins, has failed to show a significant relationship.

The one clear-cut relationship with an etiologic agent is radiation. Radiation induced fibrosarcoma of the chest wall following mastectomy for breast cancer was reported by Adam and Reif in 1977;[18] in 1985 Kuten and colleagues [19] described 7 additional cases. At the M. D. Anderson Cancer Center, there were 16 cases of radiation-induced sarcomas of the chest wall between 1944 and 1984 (representing 5% of 331 sarcomas of the chest wall seen during that period).[20] O'Neil and colleagues also reviewed 11 patients with soft-tissue fibrosarcomas after radiation of the chest wall for breast cancer.[21] Halperin reported 5 cases of bone or soft tissue sarcomas occurring within 5 years after treatment for Hodgkin's disease.[22]

The osteosarcomas have a more distinctive relationship to radiation. Arlen recorded 50 patients with post-irradiation osteosarcoma[23] and Martland described osteosarcoma in radium dye workers (painters of luminous watch dials).[24]

The sites of sarcomas vary; a review of 6834 patients by Yang et al, showed 45% in the lower extremity, 14% in the upper extremity, 32% in the trunk and retroperitoneum, and 9% in the head and neck.[25] Within the trunk, approximately 40% are retroperitoneal and the remaining sites include abdominal wall, chest wall, mediastinum, and breast.

Classification

Various tissues of the supporting structure tissues and organs may give rise to a variety of benign and malignant neoplasms. Broad categories would include the tumors of fibrous tissues such as the fibromatoses and their malignant counterparts, fibrosarcomas. Fibrohistiocytic type tumors including benign fibrohistiocytoma, dermatofibromas, xanthomas, and the intermediate level, dermatofibrosarcoma protuberans; and their malignant counterparts, malignant fibrous histiocytoma. Tumors and tumor-like conditions of adipose tissue include benign simple lipoma, angiolipoma; and their malignant counterpart, liposarcoma, which may be well-differentiated myxoid, round cell, pleomorphic, or dedifferentiated. Tumors of muscle

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tissue include the smooth muscle leiomyomas and angiomyoma which have malignant counterparts in leiomyosarcoma.

Striated muscles may also develop into rhabdomyomas or their malignant counterpart, rhabdomyosarcoma (embryonal type, alveolar, pleomorphic, or mixed). Vascular neoplasms include hemangioma, glomus tumor, and hemangiopericytoma; and their malignant counterparts, hemangiosarcoma, angiosarcoma, hemangiopericytoma, as well as benign lymphangioma and malignant lymphangiosarcoma. Tumors of synovial tissue origin include benign synovitis; nodular tenosynovitis, and their malignant counterparts, synovial sarcoma which may be monophasic or biphasic. Peripheral nerve tumors may be benign (schwannoma, neurofibroma or neurofibromatosis) or malignant (malignant schwannoma and neurofibrosarcoma). Cartilage and bone-forming tissue tumors include myositis ossificans, fibrodysplasias, extraskeletal chondromas, osteomas, and their malignant counterparts, extraskeletal or skeletal chondrosarcoma, and osteosarcoma.

Although there are certain survival characteristics with some tissue types in general, the survival outcome by various tissue types is less predictable then with other forms of histologic classification, i.e., grading. In general, patients with low grade tumors have a better survival than those with high grade tumors, which are generally considered more likely to metastasize and to have a poor outcome. General criteria for grading include: mitotic rate, nuclear morphology, degree of cellularity, cellular anaplasia, or pleomorphism. In the presence of necrosis they are not as easily quantifiable, and an important experiential factor reported by Costa and colleagues has emphasized the role of tumor necrosis in the grading scheme.[26] They found this to be the best histopathologic parameter for predicting time to recurrence and overall survival. Thus, Grade II tumors had minimal or no necrosis and Grade III tumors with high grade lesions had moderate or marked necrosis. The merit of this system has been confirmed by Lack et al.,[27] who, reviewing 300 extremity sarcomas, found the degree of necrosis to be the most significant determinant in predicting time to recurrence of overall survival. These authors, however, had only a 64% concordance rate in assigning the grade to the 87 extremity soft-tissue sarcomas reviewed previously by Costa and colleagues. Trojan et al utilized tumor differentiation mitosis count and the degree of tumor necrosis to predict prognosis: they reported a 75% concordance rate in the grading of 25 soft-tissue sarcomas, between an experienced panel of pathologists and a study group of 15 pathologists who were not involved in developing the grading system.[28,29]

Personal experience suggests that a physician's experience is very important in grading sarcomas; and it is often useful to consider a second opinion when there is a disagreement regarding the type or the grade of a certain sarcoma. The knowledge of grading is extremely important in the staging of a tumor.

The American Joint Committee staging system for soft-tissue sarcomas includes T for primary tumors, (T1 vs. T2, >5 vs. <5), G for histologic grade, (G1 low, G2 moderate, G3 high); and regional nodes, N0, N1, and distant disease. Thus, Stage I, Stage II, and Stage III are primarily determined by the grade with the difference in size, providing the sub-categorization A vs. B. Stage IV, IVA, is G1 through G3, with T1 to T2, N1, N0, and Stage IVB includes the N1. In the previous staging system, there was a category for extension onto bone, nerve, or vessel (Stage IIIC), but this has been eliminated from the current staging system. The 5-year outcome, disease-free survival, ranges from 1A extremity series included 1A (100%), 1B 88%, 2A 83%, 2B 52%, 3A 87%, 3B 39%, 4A. In the larger collection of material from the AJC, survival in the Stage I, 80%; Stage II, 65%; Stage III, 44%; and Stage IV, 10%.

The other system of staging for extremity tumors has been proposed by Enneking[30] in which the stage is compartmentalized according to grade.

We have asked members of the oncology community at Brown University to address some of the issues of soft-tissue and bone sarcomas. Drs. Michael Vezeridis and Dan Avradopoulos focus on the surgical management of soft-tissue sarcomas, while Drs. Arvin Glicksman and Li Liu focus on the use of radiation therapy, alone and as an adjunct to surgery in these tumors' management. The overview of sarcomas and biologic considerations are addressed by Drs. Helena Chang and Maureen Chung, and bone tumors are presented by Dr. Richard Terek. A discussion of the management of recurrent metastatic disease and neoadjuvant therapy is presented by Dr. Jeffrey Clark. We are fortunate at Brown in having a large group of surgical, radiation, and medical oncologists who bring their expertise to these discussions for the larger Rhode Island medical and surgical community.

References

1. Li FP, Fraumeni JF, Jr. Soft-tissue sarcomas, breast cancer, and other neoplasms. A familial syndrome? *Ann Intern Med* 1969;71:747-752.
2. Lynge E, Storm HH, Jensen OM. The evaluation of trends in soft tissue sarcoma according to diagnostic criteria and consumption of phenoxyherbicides. *Cancer* 1987;60:1896-1901.
3. Schjweisguth O, Gerard-Marchant R, Lemerle J. Naevomatose basocellulaire association a un rhadomyosarcome congenital. *Arch Fr Pediatr* 1968;25:1083-1093.
4. Heard G. Malignant disease in von Recklinghausen's neurofibromatosis. *Proc R Soc Med* 1963;56:502-503.
5. Reed WB, Nickel WR, Campion G. Internal manifestations of tuberous sclerosis. *Arch Dermatol* 1963;87:715-728.
6. Epstein CJ, Martin GM, Schultz Al, et al. Werner's syndrome. A review of its symptomatology, natural history, pathologic features, genetics and relationship to the natural aging process. *Medicine* (Baltimore) 1966;45:177-221.
7. Usui M, Ishii S, Yamawaski S et al. The occurrence of soft tissue sarcomas in

three siblings with Wernerís syndrome. *Cancer* 1984;54:2580-2586.
8. DíAgostino A. Sarcomas of the peripheral nerves and somatic soft tissues associated with multiple neurofibromatosis. *Cancer* 1963;16:1015.
9. Buck BE. Congenital neurogenous sarcoma with rhadomyosarcomatous differentiation. *J Pedric Surg* 1977; 12:581-582.
10. Hammond JA. Detection of malignant change in neurofibromatosis by gallium-67 scanning. *Can Med Assoc J* 1978;119:352-353.
11. Herman J. Sarcomatous transformation in multiple neurofibromatosis. *Ann Surg* 1950;131:206.
12. Hunt K. Neurofibrosarcoma complicating von Recklinghausen's disease. *J Ky Med Assoc* 1976;74:346-349.
13. Lee C. Malignant degeneration of thoracic neurofibromata. *NY State J Med* 1972;75:347-352.
14. Wander JW, Das Gupta TK. Neurofibromatosis. *Curr Prob Surg* 1977;14:1-81.
15. Riccardi VM, Medical progress. von Recklinghausen neurofibromatosis. *N Eng J Med* 1981;305:1617-1626.
16. Nambisan RN, Rao U, Moore R, et al. Malignant soft tissue tumors of nerve sheath origin. *J Surg Oncol* 1984;25:268-272.
17. Sorensen SA, Mulvihill JJ, Nielsen A. Long-term follow-up of von Recklinghausen neurofibromatosis survival and malignant neoplasm. *N Eng J Med* 1986;314:1010-1015.
18. Adam YG, Reif R. Radiation-induced fibrosarcoma following treatment for breast cancer. *Surgery* 1977;81:421-425.
19. Kuten A, Sapir D, Cohen Y, et al. Postirradiation soft tissue sarcoma occurring in breast cancer patients: Report of seven cases and results of combination chemotherapy. *J Surg Oncol* 1985;28:168-171.
20. Souba WW, McKenna RJ, Meis J, et al. Radiation-induced sarcoma of the chest wall. *Cancer* 1986;57:610-615.
21. O'Neill NB, Cocke W, Mason D, et al. Radiation-induced soft tissue fibrosarcoma: Surgical therapy and salvage. *Ann Thorac Surg* 1982; 33:625-628.
22. Halperin EC, Greenberg MS, Suit HD. Sarcoma of bone and soft tissue following treatment of Hodgkinís disease. *Cancer* 1984;53:232-236.
23. Arlen M, Higinbotham NL, Huvos AG, et al. Radiation-induced sarcoma of the bone. *Cancer* 1971;28:1087-1099.
24. Martland HS, Humphries RE. Osteogenic sarcoma in dial painters using luminous paint. *Arch Pathol* 1919:7:406-417.
25. Yang JC, Glatstein EJ, Rosenberg SA, Antman KH. Sarcoma of soft tissue. In: deVita VT, Hellman S, Rosenberg SA. (eds.) *Cancer: Principles and Practice of Oncology*, 4th ed., Philadelphia, J.B. Lippincott,pp.1426-1488, 1993.
26. Costa J, Wesley RA, Glatstein E, et al. The grading of soft tissue sarcomas. Results of a clinicohistopathologic correlation in a series of 163 cases. *Cancer* 1984;53:530-541.
27. Lack EE, Steinberg SM, White DE, et al. Extremity soft tissue sarcomas. Analysis of prognostic variables in 300 cases and evaluation of tumor necrosis as a factor in stratifying higher-grade sarcomas. *J Surg Oncol* 1989;41:263-273.
28. Trojani M, Contesso G, Coindre JM, et al. Soft tissue sarcomas of adults. Study of pathological prognostic variables and definition of a histopathological grading system. *Int J Cancer* 1984;33:37-42.
29. Coindre JM, Trojani M, Contessa G, et al. Reproduciblility of a histopathologic grading system for adult soft tissue sarcoma. *Cancer* 1986;58: 306-309.
30. Enneking WF, Spanier SS, Goodman MA. The surgical staging of musculoskeletal sarcoma. *J Bone Joint Surg [Am]* 1 980;62:1027-1030.

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Biology of Sarcomas

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Although the mechanics of their development are not fully understood, knowledge of the complex biology of soft tissue sarcoma is crucial in the diagnosis and management of these neoplasms, as well as in the future development of better treatment options. This article will provide a framework for understanding the etiology and the histogenesis of sarcomas, the important prognostic factors in the management of these malignancies, and the genetic and chromosomal abnormalities that may be involved in tumor development and disease progression.

Abbreviations Used

ARMS	Alveolar rhabdomyosarcoma
CML	Chronic myelogenous leukemia
DNA	Deoxyribonucleic acid
ERMS	Embryonal rhabdomyosarcoma
EWS	Ewing sarcoma
FAK	Focal adhesion kinase
LOH	Loss of heterozygosity
MDR	Multidrug resistance
MFH	Malignant fibrous histiocytoma
MPNT	Malignant peripheral nerve sheath tumor
mRNA	Messenger ribonucleic acid
NF	Neurofibromatosis
PNET	Peripheral primitive neuroectodermal tumor

Etiology

The cause of sarcomas is not clearly defined. Like colorectal carcinoma, the development of a sarcoma may require multiple molecular events. Radiation sequela, viral causes and chemical exposure have been implicated in the development of sarcomas. In addition, certain inherited genetic defects result in an increased susceptibility.

Genetic Causes of Sarcomas

The Li-Fraumeni syndrome is an inherited disease transmitted in an autosomal dominant manner, initially identified in a large cohort of patients with childhood sarcomas.[1] This genetic disorder predisposes the affected individual to the development of multiple cancers including breast and colorectal, adrenocortical carcinoma, leukemia and sarcomas. In most Li-Fraumeni patients, a germline mutation in the p53 tumor suppressor gene is located on the short arm of chromosome 17. The p53 gene not only functions as a negative regulator of cell proliferation, but may also play a role in apoptosis. The p53 alteration is present in 40-50% of all cancer patients and a somatic mutation in p53 has been identified in patients with sarcoma without the Li-Fraumeni syndrome.[2] Not all patients with Li-Fraumeni syndrome develop sarcomas, indicating that p53 mutation is not the sole mechanism responsible for sarcoma development.[3] It has been suggested that p53 mutation or deletion increases susceptibility to further damage that may result in tumor development.

Children with the inherited form of retinoblastoma often develop an osteosarcoma. The responsible genetic defect has been identified as *Rb1* locus on chromosome 13. Deletion of *Rb1* results in loss of the enzyme esterase D. In the inherited form of retinoblastoma, there is already a loss of one allele; consequently the loss of only one more at the somatic level is necessary for tumorigenesis. How a single copy loss of Rb1 results in a sarcoma is not fully understood. It has been hypothesized that Rb1 loss may lead to an increased susceptibility to radiation in a manner similar to Li-Fraumeni syndrome

Malignant peripheral nerve sheath tumors (MPNT) develop frequently in patients with neurofibromatosis of the NF-1 type. The NF-1 gene has been identified at chromosome 17q11.2. Mutations in NF-1 predispose the affected individual to MPNT; it has been proposed that the NF-1 gene is a tumor suppressor gene that controls cell growth via a signal transduction pathway.

Radiation Injury

There has been a clear association between radiation exposure and soft tissue and osteosarcomas. In general, the median latency period between radiation exposure and the development of a sarcoma is 10-12 years (range 3-40 years) after a minimal dose of 30 Gy over a 3 week period.[4] A recent study[5] from Finland showed that postirradiation sarcomas are infrequent (33 cases identified from 1953 to 1988). In this study, the median total radiation dose was 36Gy and the median interval from exposure to diagnosis of the post irradiation sarcoma was 13.2 years. The primary tumors for which radiation was most frequently used were breast, gynecological neoplasms, and Hodgkin's lymphoma. The tissues susceptible to the development of postradiation sarcomas include not only the irradiated area, but also the area of post irradiation lymphedema. The most common sarcomas seen after radiation are osteosarcomas, malignant fibrous histiocytoma, fibrosarcoma, and lymphangiosarcoma. Postirradiation sarcomas have high morbidity and mortality rates, emphasizing the importance of long term follow-up of patients treated with radiotherapy.[6,7]

It has been postulated that radiation induces breaks in the DNA with chromosomal translocations and activation of oncogenes. Supporting evidence has been found in patients who develop chromosomal changes after radiation exposure. This phenomenon has been documented in a patient with

an Askin tumor treated with radiation.[8] The karyotype of this patient's initial tumor was 46, XX, t(8;18), t(11;22). Subsequent recurrence in the irradiated fields showed new chromosomal translocations, clonal in origin.

Infectious Agents

Although viruses have been implicated in the development of sarcomas in animals, no viruses have been implicated as causative agents of sarcomas in humans. Kaposi's sarcoma is not a true sarcoma, but its etiology suggests that viruses may one day be implicated as a cause of soft tissue sarcomas. The marked increase in the incidence of Kaposi's sarcoma in the immunosuppressed population, particularly AIDS patients, had suggested a causative role for an infectious agent in this malignancy. Kaposi's sarcoma affects two main groups: elderly Mediterranean males in whom the disease is indolent and non-life threatening, and HIV-positive individuals in whom the disease is aggressive and progresses rapidly. It has been postulated that a previously uncharacterized herpes virus may be the causative agent for Kaposi's sarcoma. Recent evidence suggests that this virus does exist and is large, measuring over 270 kB.[9]

Chemical Exposure

Epidemiological studies have evaluated the relationship between certain chemical exposures and the development of soft tissue sarcomas. A recent review evaluated published cohort studies which had suggested a causal relationship between these chemicals and soft tissue sarcomas in farmers and manufacturers of phenoxy acids and chlorophenols.[10] The relative risk of developing these neoplasms after exposure to these chemicals ranged from 3.3-15.5. However, close examination of these studies not only revealed small sample sizes and inadequate follow-up, but also that some of the individuals who developed sarcomas were never really exposed to the chemicals in question. Some animal studies have suggested that chlorophenols may be important for tumor progression. This has been most clearly shown in mice, where exposure to 2, 4, 6-trichlorophenol caused an increase in reticulum cell sarcoma. However, the role of this chemical, as well as others, in the development of sarcomas remains to be elucidated.

Histogenesis

Soft tissue sarcomas comprise a heterogeneity of numerous sarcomas. The primitive mesenchymal cells may differentiate into mature lineage of functioning tissues or may de-differentiate and transform into sarcomas. The histogenesis of the common sarcomas is outlined in Table I. While this classification provides a framework for treatment, it is a simplified view since many connective tissues are multipotential in nature.

Liposarcoma

Liposarcoma is one of the most common types of soft tissue sarcoma.[11,12] In the extremity, liposarcoma accounts for 60% of all cases.[13] In the retroperitoneum, liposarcoma is also the most frequent sarcoma.[14] Five subtypes of liposarcoma have been described: well differentiated, myxoid, fibroblastic, lipoblastic and pleomorphic. The first two are low-grade sarcomas; the last three are considered high-grade neoplasms, with the exception of fibroblastic liposarcoma, which may give rise to an occasional low grade tumor. In multivariate analysis tumor grade and size along with histology subtype were found to be independent prognosticators of metastasis and overall survival.[15,16]

Malignant Fibrous Histiocytoma (MFH)

The term malignant fibrous histiocytoma dates from 1963;[17] today the MFH is considered one of the most common soft-tissue sarcomas of the extremity,[11,13] with four histologic subtypes: myxoid, storiform, pleomorphic and inflammatory. Histologic types, tumor size and tumor necrosis can predict survival of the patients with MFH.[18]

Desmoid Tumor

Two types of desmoid tumors, low grade fibrosarcoma, have been reported: the abdominal and extra-abdominal forms. The abdominal is frequently located within the anterior wall of young women, while the extra-abdominal desmoid frequently occurs in middle-aged men. Although desmoid tumors generally do not metastasize, the hallmark of this disease is aggressive local invasiveness and local recurrences after resection. Age is an important prognosticator: onset between the ages of 18 and 30 demonstrates an increased risk for local recurrence.

Fibrosarcoma

Fibrosarcoma is the third most common soft-tissue sarcoma, following liposarcoma and MFH, and the fourth common soft tissue sarcoma when visceral and retroperitoneal sarcomas are included. The latter two areas are characterized by the frequent occurrence of leiomyosarcoma. Fibrosarcoma by itself is associated with increased risk of local recurrence.[11]

Leiomyosarcoma

Leiomyosarcoma is less common in extremity[13] but frequent in abdomen and retroperitoneum. The majority are high grade lesions. Both the anatomic site of tumor origin and the high grade presentation predict their survival. While extremity sarcomas preferably metastasize to lung, leiomyosarcomas in the abdomen and retroperitoneum predominantly metastasize to the liver, and less frequently involve lung.

Rhabdomyosarcoma

Rhabdomyosarcomas are the most common soft tissue sarcoma of childhood and adolescence. They may occur in any anatomic site including areas that do not have skeletal muscle as a normal constituent. Histologically, they are subtyped into embryonal, alveolar and pleomorphic variants. The botryoid variant of the embryonal type, embryonal, pleomorphic and alveolar rhabdomyosarcomas have a progressively worse prognosis in the order listed.[19] Next only to the epithelioid sarcoma, rhabdomyosarcoma is associated with frequent nodal metastases. Unlike other soft tissue sarcomas, these

tumors are sensitive to chemotherapy when they occur in children.

Malignant Peripheral Nerve Sheath Tumor (MPNTs)

Malignant peripheral nerve sheath tumor, also known as a malignant schwannoma, is a rare type of sarcoma which accounts for 4 -10% of extremity sarcoma. It arises from major nerves and frequently is associated with the neurofibromatosis type 1 (NF-1). The MPNTs are almost always high grade and large; thus patients fare poorly.

Angiosarcoma, Lymphangiosarcoma and Hemangiopericytomas

These three types are grouped under vascular soft-tissue sarcomas. Angiosarcomas and lymphangiosarcomas originate from endothelial cells while malignant hemangiopericytomas originate from the pericyte of Zimmermann. These tumors are found evenly distributed in all anatomical sites with slight preferential occurrence in the retroperitoneum, head and neck. They are often large, high-grade and deeply located, which correlate with their poor prognosis. Lymphangiosarcoma frequently appears in the area with long-standing lymphedema. Both angiosarcoma and lymphangiosarcoma may present with regional node metastasis.

Synovial Sarcoma

Synovial sarcomas morphologically resemble developing synovium. Although they frequently occur adjacent to a joint, particularly the knee, true intra-articular tumors account for fewer than 10% of all synovial sarcomas. Large size and frequent mitosis are poor prognosticators for this tumor with 5-year survival rates varying from 25-62%. These tumors frequently metastasize to the lymph nodes, lung and bone.

Epithelioid Sarcoma

Epithelial sarcoma was first described in 1961 and was not well recognized until defining details were provided by Enzinger in 1990. This tumor frequently affects the hands and feet of young individuals with a seemingly innocent presentation but subsequently develop unrelenting metastases. While other sarcomas have infrequent or no nodal metastases, the epithelioid tumor frequently metastasizes to regional lymph nodes.

Alveolar Soft-part Sarcoma

The origin of this tumor is not clearly defined. The granular cell myoblastoma, paraganglion and muscle origins have all been suggested. Recent studies employing electron microscopic examination and immunohistochemical staining argue against these postulations. The current theory is that this tumor may arise from an angioreninoma. Alveolar soft-part sarcoma is characterized by its indolent growth, and survival is possible even after the metastasis is resected.

Sarcomas are diverse tumors of mesenchymal origin with certain characterisitics unique for each tissue type. Chromosomal translocations resulting from various insults may play a role in the genesis of these malignancies.

Risk Factors for Metastasis

In large series of patients with sarcoma, location of the tumor, tumor grade (high grade) tumor size (>5 cm) are repeatedly shown to adversely impact the outcome.[13,14,16] Other factors such as histologic type or subtype as well as inadequate resection margins are indicative of a poor survival.[15,16] A combination of multiple poor prognosticators further increases the risks of metastasis.[16] The prognostic impact of high grade sarcoma is diminished if the tumor is less than 5 cm.

Risk Factors for Local Recurrence

While survival is paramount in treating cancer, local control of disease is also important - particularly in the case of soft tissue sarcomas, because of their notorious invasiveness and frequent subsequent local recurrences. Often, repeated local failures lead to limb loss and disability, in addition to multiple surgeries. In rare occasions, failure to control the disease locally may lead to patients' death. It is therefore important to recognize the factors that predict local recurrence. The literature suggests that elderly age, high grade tumor, large size, histologic subtype such as embryonal rhabdomyosarcoma and fibrosarcoma, and inadequate resection margins are risk factors for local failure.[11] The addition of radiation treatment has successfully curtailed the incidence of local recurrence of extremity sarcomas in patients with an increased risk. A recent report has suggested that administering radiation to patients with low-grade sarcoma greater than 5 cm does not improve local control, but favorably affects survival in a delayed fashion among patients with inadequate resection margin.

Molecular Biology of Sarcomas

The current staging of sarcoma is based on gross and histopathologic assessment. Although there is some prognostic value to the current staging system, further study is needed to refine the system for defining tumor biology. It is hoped that the understanding of genetic abnormalities of sarcoma will improve treatment for targeted high risk patients.

Genes are ultimately responsible for cell behavior. Abnormalities in gene expression presumably underlie all pathologic states of malignancy. At the simplest level, genes which control growth and differentiation can divide into two types: tumor suppressor genes and oncogenes. Suppressor genes ordinarily restrain the cell and prevent uncontrolled division. A mutation in a suppressor gene may abolish the growth regulatory mechanism. On the other hand, abnormal expression of an oncogene may stimulate uninhibited growth. In reality, the molecular defects and interplays are much more complicated than described. There are multiple layers of gene interaction and regulation and numerous possibilities

which result in abnormal gene expression. These mechanisms include point mutations, deletions and rearrangements. Mutations in genes which regulate the activity of both suppressor genes and oncogenes can give similar results as mutations affecting the suppressor or oncogenes themselves. One difficulty is that tumors usually have multiple genetic abnormalities. While for some tumors, such as colon cancer, one can trace the progression of genetic abnormalities between a premalignant polyp and an invasive cancer, this is not yet possible for sarcoma.

Table I. Classification of sarcomas according to tissue origin.

Tissue Origin	Sarcomas
Adipose tissue	Liposarcoma
Fibrous tissue	Malignant fibrous histiocytoma Desmoid tumor
Smooth muscle	Leiomyosarcoma
Skeletal muscle	Rhabdomyosarcoma
Peripheral nerve	Malignant peripheral nerve sheath tumor
Vessels	Lymphangiosarcoma Angiosarcoma Hemangiopericytoma
Tenosynovial tissues	Synovial sarcoma
Bone	Osteogenic sarcoma Chondrosarcoma Ewing sarcoma
Unclassified	Epithelioid sarcoma Alveolar soft-part sarcoma

Chromosomal Translocations

As previously discussed, radiation injury has been implicated in the formation of sarcomas. Radiation is known to cause DNA breaks which allow novel DNA re-anneal, resulting in chromosomal translocations and possible malignant transformation. Table II outlines documented chromosomal translocations. They are frequent events occurring in up to 95% of some sarcomas. These chromosomal translocations allow for some genes, particularly oncogenes, to be brought in proximity of a different gene promotor. The fusion of a normally expressed gene with an oncogene which is normally not expressed results in inappropriate expression of the oncogene, as it is now activated under control of the promoter of the normal gene. The activation of oncogenes results in increased cell growth and malignant transformation (the case with *bcr/abl* in chronic myelogenous leukemia (CML) and *bcl-2* in non-Hodgkin's B-cell lymphoma). The following chromosomal translocations play a significant role in the development of soft tissue and bone sarcomas.

Alveolar rhabdomyosarcoma (ARMS) has a characteristic chromosomal translocation between the long arm of chromosome 2 and 13 referred to as t(2;13)(q35;q14). This places the *PAX3* gene (involved in transcriptional regulation of neuromuscular development) in proximity with the ALVgene (a member of the forkhead family of transcriptional factors). Embryonal rhabdomyosarcoma (ERMS) has a loss of heterozygosity (LOH) at 11p15 locus. This mutation is close to the locus of *IGFII*, and may result in loss of a tumor suppressor gene, activation of an oncogene, or duplication (by imprinting) of IGFII. Both ARMS and ERMS appear to have increased levels of *IGFII*, a growth factor which may contribute to the growth of rhabdomyosarcoma.

Ewing sarcoma (EWS) is a round cell tumor of bone. Almost all these tumors have a translocation between chromosomes 11 and 22 affecting the same break point. It has long been postulated that a gene at this location is responsible for development of Ewing sarcoma. The translocation produces a fusion protein between the EWS and FLI-1 gene, the latter being a member of the *ets* oncogene family.[30] The discovery of *EWS/FLI-1* has added some order to the general class of small round cell tumors which includes PNET (peripheral primitive neuroectodermal tumor), Ewing sarcoma, and Askin tumor, since many share the common feature of fusion of EWS with a transcription factor or similar mutations.

Tumor Suppressor Genes and Oncogenes

Tumor Suppressor Genes

The two most well-studied tumor suppressor genes are the retinoblastoma (Rb) and p53 genes. The Rb gene was the first of such genes to be discovered. The tumor suppressive effect was initially hypothesized by Knudsen, based on the differences in epidemiology between hereditary and spontaneous retinoblastoma.[21] Mutations in the Rb gene are the basis for virtually all retinoblastomas. Interestingly, patients with hereditary retinoblastoma are at risk for other neoplasms: approximately 15% of these patients develop additional tumors, half of which will be osteosarcomas. Analysis of a series of patients with osteogenic sarcomas without known retinoblastoma revealed 35% had Rb mutations.[22]

The Rb gene has been cloned and its function defined as a regulator of cell proliferation. In the hypophosphorylated state, Rb binds to DNA and prevents cell replication. When it becomes phosphorylated, it does not bind DNA and the cell divides. Many growth factors and cytokines affect the phosphorylation state of Rb, and hence its function. Mutations in the Rb gene inactivate it and in some settings allow ungoverned cell proliferation and tumor development. Rb is a recessive suppressor gene since both copies must be mutated to lose the suppressive activity of Rb. So

as long as one copy of the gene is normal, there will be enough activity in the normal protein to effectively regulate the cell since there is no interaction between the wild type and mutant Rb protein.

The most commonly mutated tumor suppressor gene in human cancer is the p53 gene, which is mutated in approximately 50% of all tumors. The Li-Fraumeni syndrome is an inherited defect in this tumor suppressor gene. One postulated role for p53 is to arrest the cell cycle when there is DNA damage so that the cell can repair itself before dividing. Cells lacking normal p53 function continue to divide before the DNA damage can be repaired and pass along potentially tumorigenic mutations. p53 can also suppress transcription of other growth related genes such as *c-fos* and *c-jun*. p53 is called a **dominant** suppressor gene since a mutation in just one copy of the gene can inactivate the normal wild-type protein. The mutated protein binds to the wild-type protein and the complex becomes inactive. 28-65% of osteosarcoma have p53 mutations.[23] Only a few patients with osteosarcoma have a new germ-line p53 mutation. Half of the somatic mutations are point mutations; the others are gross rearrangements or deletions.[24]

The murine double minute gene-2 (MDM2) gene inhibits p53 by binding to p53, thereby preventing p53 from binding to DNA. When the MDM2 is overexpressed, p53 becomes inactivated. The overexpression of MDM2 by gene amplification has been found to occur in 10% of osteosarcoma, 13% of Ewing sarcoma, but not in chondrosarcoma.[25]

Undoubtedly, not-yet-discovered

Table II. Chromosomal translocations identified in sarcomas.

PNT	Characteristic cytogenetic event	Frequency (%)	
Ewing sarcoma	t(11:22)(g24;q11.2-12)	95	fusion proteinEWS/*Fli* 1 which is a transcription factor
Alveolar rhabdomyosarcoma (ARMS)	t(2:13)	80	fusion of PAX3 with *ALV*, a DNA transcription factor
Embryonal rhabdomyosarcoma (ERMS)	+2q, +20	80	
Synovial sarcoma	t(X:18)	95	
MFH	complex[a]	90	
malignant nerve sheath tumor (MPNTs)	complex[a]	90	
leiomyosarcoma	1p-	75	
infantile fibrosarcoma	+11, +17, +20	90	
dermatofibrosarcoma protuberans	ring chromosome 17	90	
myxoid liposarcoma	t(12:16)	75	fusion of CHOP with *TLS* which results in a DNA transcription factor
pleomorphic liposarcoma	complex	90	
well-differentiated liposarcoma	ring chromosome 12	80	
clear cell sarcoma	t(12:22)	90	fusion EWS and *ATF*- 1, a DNA transcription factor
endometrial stromal sarcoma	t(7;17)	50	
intra-abdom desmoplastic small round cell tumor	t(11:22)(p13:q12)	>50	
mesothelioma	1p-, 3p-, -22	90	
myxoid chondrosarcoma	t(9;22)	50	

[a]complex indicates the consistent finding of extremely complex karyotypes containing multiple numerical and structural chromosome aberrations.

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tumor suppressor genes account for the tumors in which Rb, p53, and MDM2 are normally expressed. Although the suppressor gene mutations occur frequently in sarcomas, this knowledge has not been translated into therapeutic use. In cell culture, the normal gene can be inserted into a cell and normal Rb or p53 function restored.

Some abnormalities in soft tissue sarcoma are the same as those in bone sarcoma. Approximately 4% of soft-tissue sarcoma have Rb homozygous mutations while 33% have heterozygous mutations.[26] In one study, 33% of soft-tissue sarcoma had p53 mutation;[27] 37% had MDM2 amplification.[28] Since the incidence of soft tissue sarcoma is approximately 5-10 times more common than bone sarcomas, it has been possible to test some genetic abnormalities for their prognostic significance. It was initially thought that lack of Rb expression in soft-tissue sarcoma portended a worse prognosis;[29] however, now that a larger number of cases have been studied, Rb expression may not be prognostically significant.

The most important advance in the treatment of osteosarcoma is multiagent chemotherapy. The amount of chemotherapy-induced tumor necrosis is the most important prognostic variable for survival. Expression of the multidrug resistance (MDR) gene has correlated with tumor necrosis and survival.[30] MDR codes for p-glycoprotein, which functions as an energy-dependent transmembrane efflux pump which prevents intracellular accumulation of some chemotherapeutic agents. By assessing tumors for MDR expression at the time of biopsy, it may be possible to administer the MDR antagonist along with chemotherapy, to increase the effectiveness of the chemotherapy or to employ the dose-intensified chemotherapy with bone marrow transplantation for high risk patients.

Oncogenes

Oncogenes are normal genes, similar to viral oncogenes. Many are normally expressed during growth and development. However, when they are abnormally expressed because of an activating mutation or fusion with a normal gene they have the ability to induce uncontrolled growth. The first identified transforming oncogene was c-*src*, the cellular homologue of v-*src*, the Rous sarcoma virus oncogene which is capable of inducing sarcomas in animals. The protein product $pp60^{c\text{-}src}$ is a tyrosine kinase. Functions of oncogenes can be grouped into growth factors, growth factor receptors which usually have tyrosine kinase activity, guanine binding proteins which are part of the signal transduction pathway for growth factor receptors, cytoplasmic oncoproteins with serine/threonine protein kinase activity, nuclear transcription factors, and those which remain unclassified.

Over 50 oncogenes have been described. Some have been evaluated in sarcoma. In a series of 26 sarcomas, analyzed with Southern blotting for amplification of N-*ras*, H-*ras*, *sis*, *erb*-B-1, *erb*-B-2, *fos*, N-*myc*, c-*myc*, *mos*, and *yes*, only 3 tumors had amplification or rearrangement affecting *sis*, H-*ras*, c-*myc*, and *neu*.[31]

Erb-2 (HER-2/*neu*) is a truncated version of the epidermal growth factor receptor which has high intrinsic autophosphorylating protein kinase activity. Amplification of erb-2 has been suggested to carry a poor prognosis in some subsets of breast cancer patients. The functional role of erb-2 in soft tissue sarcoma has not been defined. Immunostaining of *erb*-B-2 expression in sarcoma did not find overexpression in 87 soft-tissue sarcomas or 45 bone sarcomas.[32] In another study, 2 of 6 benign soft tissue tumors and 6 of 105 sarcomas had amplification of *erb*-B-2 and a 37% increase of mRNA. There was no correlation between *erb*-B-2 gene amplification or mRHA level with protein expression on histologic grade.[33] This indicates that a complete analysis of each oncogene must include Southern blotting for gene amplification and rearrangements, Northern blotting for increased mRNA expression which can occur in the absence of gene amplification, and Western blotting to assess

protein expression resulting from translational changes without alterateration in DNA or RNA.

The focal adhesion kinase (FAK) gene codes for $p125^{FAK}$ tyrosine kinase and is involved in cell adhesion, motility, and anchorage independent growth. Increased amounts of $p125^{FAK}$ has been found by Western blotting in 13 of 13 sarcoma when compared to normal tissue or hyperplastic lesions, suggesting that $p125^{FAK}$ may be related to invasion and metastasis.[34]

Malignant transformation usually is an end result of interplay of tumor suppressor gene(s) and oncogene(s) mutation. Given the sheer number of genes which seem related to tumorigenesis, and the labor-intensive nature of testing tumors for each gene abnormality, the relative contribution of each of these genes to tumor development is currently unclear. A recent paper describing a new method for quantitatively and simultaneously assessing expression of a large number of genes in a tissue may allow for a more complete analysis of abnormalities in gene expression in tumors.[35]

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Conclusion

Sarcomas are diverse tumors of mesenchymal origin with characteristics unique for each tissue type. Chromosomal translocations resulting from various insults may play a role in the genesis of these malignancies. As the genetic abnormalities unfold in sarcoma and as assays for these mutations become faster and more widely available, the complete genetic profile of a tumor should become possible. Some of the genetic abnormalities may be targets for gene therapy or may serve as a guide to selecting and modifying adjuvant treatments.

References

1. Li FP, Fraumeni JFJ. Soft-tissue sarcomas, breast cancer, and other neoplasms: A familial syndrome? Ann Intern Med 1969; 71:747-752.
2. Soussi T, LeBlanc T, Baruchel A, Schaison G. Germline mutations of p53 tumor suppressor gene in cancer-prone families: a review. *Nouv* Rev Fr Hematol 1993;35:33-36.
3. McGuire SM, McGuire AL, McGuire MH. The genetic risk factors for bone and soft tissue tumors. Surg Clin North Am 1994;3:599-607.
4. Kohn HI, Fry RJM. Radiation carcinogenesis. N Eng J Med 1984;310:504-511.
5. Wiklund TA, Blomqvist CP, Raty J, et al. Post irradiation sarcoma. Analysis of a nationwide cancer registry material. Cancer 1991;68:524-531.
6. Perez CA, Beat MG, Taylor ME. Radiation-induced sarcomas following treatment of carcinoma of the breast. KEY *Breast Diseases.* 1995;6:145-147.
7. Davidson T, Westbury G, Harmer CL. Radiation-induced soft tissue sarcoma. Br J Surg 1986;73:308-309.
8. Sawyer JR, Chadduck WM, Keltzel M. Progression of chromosome abnormalities after radiation therapy in a patient with Askin's tumor. *Cancer Genet Cytogent.* 1990;47:89-94.
9. Chang Y, Cesarman E, Pessin MS, et al. Identification of herpes virus-like DNA sequences in AIDS - associated Kaposi's sarcoma. *Science* 1994;266: 1865-1869.
10. Johnson ES. Association between soft tissue sarcomas, malignant lymphomas, and phenoxy herbicides/ chlorophenols: Evidence from occupational cohort studies. *Fundam and Appl Toxicol* 1990;14:219-234.
11. Collin C, Hajdu SI, Godbold J, et al Localized operable soft-tissue sarcoma of the lower extremity. Arch Surg 1986;121:1425-1433.
12. Lehti PM, Moseley HS, Peetz MZ, Fletcher WS. Liposarcoma of the leg. *Am J Surg* 1982;144:44-47.
13. Brennan MF. Management of extremity soft-tissue sarcoma. *Am J Surg* 1989;158:71-78.
14. Bevilacqua RG, Rogatko A, Hajdu SI, Brennan MF. Prognostic factors in primary retroperitoneal soft-tissue sarcomas. *Arch Surg* 1991;126:328-334.
15. Chang HR, Hajdu SI, Collin C, Brennan MF. The prognostic value of histologic subtypes in primary extremity liposarcoma. *Cancer* 1989;64: 1514-1520.
16. Chang HR, Gaynor J, Tan C, et al. Multifactorial analysis of survival in primary extremity liposarcoma. *World J Surg* 1990;14:610-618.
17. Ozzello L, Stout AP, Murray AR. Cultural characteristics of malignant histiocytomas and fibrous xanthomas. *Cancer* 1963;16:331-337.
18. Rooser B, Willen H, Gustafson P, et al. Malignant fibrous histiocytoma of soft tissue. Cancer 1991; 67:499-505.
19. Wexler LH, Helman LJ. Pediatric soft tissue sarcomas. *Cancer* 1994;44: 211-247.
20. DeLattre O, Zucman J. Plougastel B. et al. Gene fusion with an ets DNA-binding domain caused by chromosome translocation in human tumors. *Cancer* 1993;71:3526-3530.
21. Knudson, AGJ. Mutation and cancer: Statistical study of retinoblastoma. *Pro Nat Acad Sci USA* 1971;68:820-823.
22. Araki N, Uchida A,. Kimura T, et al. Involvement of the retinoblastoma gene in primary osteosarcoma and other bone and soft-tissue tumors. *Clin. Orthop* 1991;270:271-277.
23. Wadayama B, Toguchida J, Yamaguchi T, et al. p53 expression and its relationship to DNA alterations in bone and soft tissue sarcomas. Br J Cancer 1993;68:1134-1139.
24. Toguchida J, Yamaguchi T, Ritchie B, et al. Mutation spectrum of p53 gene in bone and soft tissue sarcomas. *Cancer Res* 1992;52:6194-6199.
25. Ladanyi M, Jhanwar S, Terek R, et al. Prevalence and implications of MDM2 gene amplification in human bone sarcomas. Transactions Orthopaedic *Research Society* 1994;40:742 (Abstract).
26. Stratton MR, Williams S, Fisher C, et al. Structural alterations of RB1 gene in human sift tissue tumors. *Br J Cancer* 1989;60:202-205.
27. Oliner JD, Kinzler KW, Meltzer PS, et al. Amplification of a gene encoding a p53-associated protein in human sarcomas. *Nature* 3 1992;58:80-86.
28. Leach FS, Tokina T, Meltrzer P, et al. p53 mutation and MDM2 amplification in soft tissue sarcomas. *Cancer Res* 1993;53:2231-2234.
29. Cance WG, Brennan MF, Dudas ME, et al. Altered expression of retinoblastoma gene product in human sarcomas. *N Engl J Med.* 1990; 323: 1457-1462.
30. Wunder JS, Bel RS, Wold L, Andrulis A. Expression of the multidrug resistance gene in osteosarcoma: a pilot study. *Journal of Orthop Res* 1993;11:396-403.
31. Maillet MW, Robinson RA, Burgart LJ. Genomic alterations in sarcomas: a histologic correlative study with use of oncogene panels. *Mod Pathol* 1992;5:410-414.
32. George E, Niehans GA, Swanson PE, et al. Overexpression of the e-erbB-2 oncogene in sarcomas and small round-cell tumors of childhood. An immunohistochemical investigation. *Arch Pathol Lab Med.* 1992;116:1033-1035.
33. Duda RB, Cundiff D, August CZ, et al. Growth factor receptor and related oncogene determination in mesenchymal tumors. *Cancer* 1993;71:3526-3530.
34. Owens LV, Zu L, Craven RJ. Overexpression of the focal adhesion kinase (p124FAK) in invasive human tumors. *Cancer Res* 1995; 55:2752-2755.
35. Velculescu VE, Zhang L. Vogelstein B, Kinzler KW. Serial analysis of gene expression. *Science* 1995;270:484-487.

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Soft Tissue Sarcoma

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Soft tissue sarcomas are relatively rare tumors, comprising approximately 1% of all malignancies in adults.[1] An estimated 6,400 new cases will be diagnosed in the United States in 1996, with 3700 resultant deaths; 50-60% present in the extremities.

Historically, these tumors were treated by amputation regardless of stage on presentation. Recent data suggest that equal survival rates can be achieved using more conservative surgery. There are numerous histopathologic types of soft tissue sarcomas: the most common are liposarcomas, malignant fibrous histiocytomas, synoviosarcomas, and fibrosarcomas. Key prognostic variables in determining local recurrence include: tumor grade, adequacy of resection, and size of primary lesion. Although less important, certain cell types have been associated with increased local recurrence. These include: embryonal cell sarcoma, malignant peripheral nerve tumors, and angiosarcomas. In terms of survival, the most important prognostic indicators are grade, and size of primary lesion.[1]

Most commonly, these patients present with a firm painless mass in the extremity. Pain is an unusual symptom, as these are slow growing neoplasms surrounded by a pseudocapsule without nerve endings. Paresis may be due to involvement of the motor nerve adjacent to the mass. Swelling may be due to lymphatic or venous obstruction. On exam, these tumors are fairly well circumscribed, although deep masses may feel diffuse. Neurovascular involvement can usually be determined easily. Regional lymph node involvement is rare, occurring in only 2 to 4% of patients.[2]

The American Joint Committee on Cancer Staging for sarcoma is based on tumor size and grade. Well-differentiated tumors are Stage I; poorly-differentiated sarcomas are Stage 111. Stages are further subdivided by size of the primary lesion. A well differentiated tumor less than 5 cm would be Stage IA, and, if greater than 5 cm, Stage IB.

Suspicious masses can be evaluated radiographically with computed tomography (CT) or magnetic resonance imaging (MRI). These studies are helpful in assessing the size and depth of invasion, as well as relationships to vital neurovascular structures. A clear understanding of these relationships is needed before embarking on radical resection. Bland et al confirmed that MR imaging provided superior radiologic assessment in delineating normal soft tissue from tumor, and was highly accurate in predicting unresectability of extremity sarcomas. MR imaging was incorrect in only 3.8% of cases whereas CT was inaccurate in 24%.[3] Reuther and Mutschler reported the sensitivity of MRI to be much higher than that of CT (83% vs. 58%).[4] In addition to examining the primary site radiographically, CT scan of the lungs is recommended to rule-out pulmonary metastases, the most common site of metastasis, for these tumors.[5]

Biopsy of the primary lesion should be performed, if possible, by the surgeon who will be resecting the sarcoma. Careful planning is necessary to prevent compromise of subsequent treatment. Four possible biopsy techniques can be used: fine needle aspiration (FNA), core needle biopsy, excisional biopsy, and incisional biopsy. Although FNA is generally not recommended for soft tissue tumors, it can be useful in providing initial diagnosis with equivocal soft tissue masses. It is not helpful in determining the exact histopathologic type or degree of differentiation, but it may be useful in determining recurrences. Core needle biopsies using either a Vim-Silverman or Tru-cut needle can be extremely helpful. Several passes should be made into the tumor to avoid sampling errors, taking care of course to avoid hematomas. An excisional biopsy is not recommended for tumors larger than 3 cm since this can contaminate tissue planes and interfere with subsequent resection. The current recommendation is for an incisional biopsy, in conjunction with multiple core needle biopsies. Incisional biopsy ensures that adequate tissue will be provided for light and electron microscopy, as well as immunohistochemical studies. It is important that the incision be made along the long axis of the involved extremity, to facilitate resection of the involved muscle from orgin to insertion, should this be necessary.[2]

Once the decision to resect has been made, certain surgical principles are followed to ensure adequate excision of sarcomas. An elliptical incision is made around the previous biopsy site. The extent of skin involvement overlying the sarcoma is determined by pre-op studies, as well as incisional biopsy. Skin flaps are raised laterally, well beyond the tumor mass, to facilitate resection. Dissection is carried out proximally and distally before dissecting underneath the sarcomatous mass to ensure *en bloc* resection. Theoretically, tumor cells will spread along the long axis of the muscle, confined by the fascial compartments. If the sar-

Abbreviations Used

BRT	Brachytherapy
CT	Computed tomography
ERT	External beam radiation
FNA	Fine needle aspiration
MAID	Mesna, ifosfamide, dacarbazine and doxorubicin
MRI	Magnetic resonance imaging
MSKCC	Memorial Sloan Kettering Cancer Center
NCI	National Cancer Institute

coma abuts the periosteum, most authors recommend excising the surrounding periosteum. In selected patients a local resection of bone may be needed. A general principle in resection of soft tissue sarcomas is to obtain the largest possible margin, while minimizing interference with limb function.[6] Numerous approaches and incisions can facilitate limb preservation. Tumors involving the iliac fossa are best approached through an abdominoinguinal incision. This incision involves removing the rectus abdominis muscle from the pubic crest, and dividing the inguinal ligament. This generous incision is easily repaired, and provides excellent exposure for pelvic sarcomas.[7] In the upper extremity, claviculectomy may be required to facilitate exposure and *en bloc* resection of sarcomas in this region. This procedure requires sling support in the post-op period of approximately four weeks, but is generally well tolerated by patients.[8] Sarcomas involving the scapula may require resection of a portion of this bone. This is also well tolerated, though it is preferable to preserve the glenoid fossa. In some cases the scapula and head of the humerus may be resected, with preservation of the extremity using the Tikhoff-Linberg procedure.[6]

Special problems need to be considered with limb-sparing procedures for soft tissue sarcomas. The National Institute of Health Consensus has suggested that major vessel or nerve involvement is a contraindication to limb salvage procedures.[9] Others, however, recommend resection of the involved vessels and vascular reconstruction using autologous vein. Karakousis argues that even this highly morbid procedure is better tolerated, functionally and psychologically, than amputation. He reported a 5-year local recurrence rate of 5% using these techniques.[6]

Radiation therapy plays an important role in the treatment of soft tissue sarcomas. Its effectiveness was shown as early as 1951 by Cade,[10] who showed local control in 6 of 22 cases of unresectable sarcomas, treated with radiation alone, and survival extension from 5 to 26 years. Windeyer et al[11] reported complete regression in 14 of 22 cases, with 27% durable control, using 60 to 80 Gy. In a more recent study at the Massachusetts General Hospital (Tepper et al[12]), increasing tumor size was associated with decreased ability to achieve local control using radiation alone. In this study, 88% control was reached for tumors less than 5 cm, 53% for those between 5 and 10 cm, and 33% for lesions greater than 10 cm. This study also suggests that local control is often reached at the expense of high radiation doses, with attendant complications. The use of radiation alone should be considered in unresectable lesions, poor surgical candidates, and patients with recurrent disease. These studies led to the concept of combining surgery with radiation to achieve maximum local control.

...soft tissue sarcomas present a unique challenge to the oncologic surgeon. Careful planning is paramount to a successful outcome.

Less-than-radical surgery alone is generally not accepted, unless treating a small, low-grade lesion, which can be removed with reasonable margins. Numerous studies have shown that "shelling out" the tumor from its pseudocapsule leads to an unacceptable local failure rate ranging from 50 to 90%.[13,14] When wide local excision was used alone, the local failure rate remained unacceptably high at 35 - 60%.[13,14] Radical excision, on the other hand, (defined as excision of the entire anatomic compartment occupied by tumor, or amputation) was associated with the lowest recurrence rate, 7-18%.[14] Many subsequent studies have shown that a combination of conservative resection and radiation leads to local control rates in the range of 85%.[15,16,17] Resection in these circumstances should always include the previous biopsy site with wide excision of skin and subcutaneous tissue. In addition, many experts recommend placing clips around margins of resection to facilitate subsequent radiation treatments. In addition to NIH recommendations concerning amputations for sarcomas, most authorities feel that extensive involvement of several anatomic compartments, or gross joint involvement, are contraindications to conservative management.

The optimum sequence of radiation and surgical procedures is somewhat controversial, although most surgeons favor post-operative treatments. There are numerous theoretical advantages to pre-operative radiation. Radiation prior to interruption of blood supply should result in better response rates. Radiation should sterilize surrounding fields and thus decrease potential intraoperative spread. In most cases, radiation fields are reduced when treating the sarcoma preoperatively which should result in lower radiation related complications. Finally, many experts feel that preoperative treatment may allow resection of large, otherwise unresectable tumors.[18] Numerous studies have shown excellent local control using combination preoperative radiotherapy with conservative surgery, with local failure rates ranging from 5 to 10%.[19,20,21]

In contrast, many surgeons prefer post-operative radiotherapy - perhaps due to a perceived higher complication rate associated with preoperative radiation. In fact, there are advantages to post-operative treatment, including no delay in surgery, and no impairment of wound healing. Proper surgical technique is imperative to insure prompt radiation treatments, since post-operative seromas, and wound infections, will delay radiation by 3 to 4 weeks.[18] In general 10 to 20 days are allowed for wound healing prior to proceeding with postoperative radiotherapy. Numerous studies have shown good local control with failure rates ranging from 8 to 20%.[15,16,21,22] In a prospective randomized trial comparing amputation versus wide local excision and postoperative radiation for high grade sarcomas at the NCI, no difference in disease-free, or overall survival, was found in these two groups.[23] Four of 27 (14%) patients in the conservative surgery group re-

curred, versus 0 of 17 in the amputation group.

An alternative to external beam radiation (ERT), commonly used in many cancer centers today, is brachytherapy (BRT). This modality has many theoretical and practical advantages. Interstitial sources are capable of delivering the highest doses of radiation to those areas at greatest risk. Also, because of rapid dose fall-off, normal tissues are spared. Finally, BRT can be completed within the surgical hospital stay, contrasting with the usual delay preceding ERT.[23] Various systems have been used in the past to plan placement of implants including the Manchester[25] and Quimby[26] techniques. Today, computer-based customized dosimetry, with three-dimensional planning, is the standard. Sources of uniform strength are spaced uniformly (about 1.0 cm), to maximize tumor target and minimize dosage to normal tissues. The procedure involves marking the surgical bed with metal clips, and placing brachytherapy catheters along the longitudinal axis of the muscle bed. The dimensions of the target area will determine the number of catheters used. Catheters are secured in place 1.0 cm apart with absorbable sutures. Drains are placed between skin and implants, and attempts are made to maximize the distance between the skin and the implants to minimize wound complications. Efforts are made to avoid "hot" spots in which radiation fields overlap, as well as "cold" spots in which inadequate radiation is delivered. Presently, most centers use a combination of external radiation with brachytherapy as opposed to brachytherapy alone. Data suggests that brachytherapy may offer an advantage in local control, but, as expected, does not change survival.[24]

Complications may occur. Healing skin is most sensitive to radiation, and accounts for the most frequent complication, including wound breakdown, seromas, and abscesses. This is in contrast to large vessels which are relatively radio resistant, and seem to easily tolerate placement of adjacent implants. Meticulous surgical techniques are therefore important in providing thick, well-vascularized wound edges without undue tension, to ensure low complication rates. In general, ERT appears to be associated with higher wound complication rates than BRT. The early experience using brachytherapy at the Memorial Sloan Kettering Cancer Center (MSKCC), in the early 1980's, was associated with a high wound complication rate. Subsequent experience led to a policy of delaying brachytherapy for a minimum of 5 days, which resulted in more acceptable complication rates.[24] This coincided with evolving knowledge on the temporal sequence of wound healing, in which epithelialization occurs within 24 hrs., followed by accumulation of collagen between days 2 and 4. A rapid increase in wound tensile strength takes place between days 5 and 17. In a study using BRT in experimental animals, it was discovered that radiation delivered 1 week after wounding resulted in wounds as strong as non-irradiated controls.[24] Another complication of radiation in the MSKCC experience was neuritis, although this was relatively uncommon, occurring in only 4 patients, all of whom received doses greater than 90 Gy. Vascular complications were also uncommon.

The role of adjuvant chemotherapy in the treatment of soft tissue sarcoma has not been clearly defined, and remains investigational. Numerous agents, including ifosfamide and doxorubicin, have demonstrated significant response rates in the treatment of advanced disease. The combination of doxorubicin, dacarbazine, and ifosfamide with the uroprotective agent mesna (MAID) has been reported to have response rates of at least 50%.[27] Many randomized adjuvant trials are currently underway, using this and other regimens. In addition, neoadjuvant chemotherapy for soft tissue sarcomas has been explored to some extent, though definite conclusions cannot be made on the efficacy of pre- or postoperative chemotherapy. In a recent study by Wanebo et al, a combined preoperative approach using radiation with sensitizing chemotherapy resulted in excellent local control rates of 98.5%. Specifically, these authors used intra arterial doxorubicin 30mg/24 hrs over three days, in addition to 30 -46 Gy of radiation. Reasonable long term tumor control was achieved, though distant metastases continued to be a major challenge.[28] Similar results were reported by Eilber et al.[29]

Pulmonary metastases from sarcomas present a unique opportunity, since numerous investigators have reported long term survival after resection.[30] Computed tomography of the chest should be done at least every 12 months to detect early lesions. Patient selection for metastasectomy should be based on several criteria: control of local disease, pulmonary nodules consistent with metastases, absence of uncontrolled thoracic metastases, potential for complete resection, and sufficient pulmonary reserve post - operatively.[30] Three approaches to resection of metastases may be considered: median sternotomy, posterolateral thoracotomy, and thoracoscopic or video-assisted thoracic surgery. The selection depends on the location of metastases, and surgeon's preference. Reported 5- year survivals after resection of sarcomas are encouraging. Snyder et al reported 5-year survival rates as high as 40%, for osteogenic sarcoma.[31] Casson et al reported 5-year survival rates of 25% after resection of soft tissue sarcoma metastases.[32] Numerous prognosticators have been reported, which may help in patient selection. These include disease-free interval greater than 12 months, tumor doubling time greater than 20 days, and less than or equal to four metastatic nodules.[33]

In summary, soft tissue sarcomas present a unique challenge to the oncologic surgeon. Careful planning is paramount to a successful outcome. Cooperation between the surgeon and radiation oncologist provides the patient the best opportunity for limb-sparing resections, with acceptably low recurrence rates. Furthermore, pulmonary metastases should be aggressively resected, since long-term survival can be achieved in this group. The role of adjuvant chemotherapy is being actively explored at this time, with numerous cooperative, prospective, randomized trials.

References

1. Parker SL, Tong T, Bolden S, Wingo P.A. Cancer Statistics, 1996 CA 1996;46:5-27.
2. Neifeld JP. Etiology and clinical presentation of and biopsy approach to

soft tissue tumors. *Surgical Oncology Clinics of North America* Vol. 2, Number 4, Oct. 1993, 503 -507.
3. Bland KI, McCoy DM, Kinard RE, et al. Application of magnetic resonance imaging and computerized tomography as an adjunct to the surgical management of soft tissue sarcomas. *Ann Surg* 1987; 205: 473-481.
4. Reuther G, Mutschler W. Detection of local recurrent disease in musculoskeletal tumors: Magnetic resonance imaging versus computed tomography. *Skeletal Radiol* 1990: 19:85 -90.
5. Vezeridis MP, Moore R, Karakousis CP. Metastatic patterns in soft-tissue sarcomas. *Arch Surg* 1983; 118:915 - 918.
6. Karakousis CP. Principles of Surgical resection for Soft Tissue Sarcomas of the extremities. *Surgical Oncology Clinics of North America* 1993; 2: 547-575.
7. Karakousis CP. The abdominoinguinal incision in resection of pelvic tumors with lateral fixation. *Am J Surg* 1992; 164: 366-371.
8. Karakousis CP, Gupta BK, Zografos GC. Claviculectomy for the Exposure and En Bloc Resection of Adjacent Tumors. *Amer J of Surg* 1992; 164: 63-67.
9. Lawrence W JR. Concepts in limb-sparing treatment of adult soft tissue sarcomas. *Semin Surg Oncol* 1988; 4: 73-77.
10. Cade SS. Soft tissue tumors: Their natural history and treatment. *Proc R Soc Med* 1951; 19: 19.
11. Windeyer SB, Dische S, Mansfield CM. The place of radiotherapy in the management of fibrosarcoma of the soft tissues. *Clin Radiol* 1966; 17:32.
12. Tepper JE, Suit HD. Radiation therapy of soft tissue sarcomas. *Cancer* 1985; 55: 2273.
13. Markhede G, Angervall L, Stener B. A multivariate analysis of the prognosis after surgical treatment of malignant soft tissue tumors. *Cancer* 1982; 49: 1721.
14. Simon MA, Enneking WF. The management of soft tissue sarcoma of the extremities. *J Bone Joint Surg (Am)* 1976; 58:317.
15. Leibel SA, Transbaugh R F, Wara WM, et al. Soft tissue sarcomas of the extremity: Survival patterns of failure with conservative surgery and postoperative irradiation compared to surgery alone. *Cancer* 1982; 50: 1076.
16. Lindberg RD, Martin RG, Romsdahl MM, et al. Conservative surgery and postoperative radiotherapy in 300 adults with softtissue sarcomas. *Cancer* 1981; 47: 2391.
17. Potter DA, Glenn J, Kinsella T et al. Patterns of recurrence in patients with high-grade soft-tissue sarcomas. *J Clin Oncol* 1985; 3:353.
18. Garwood DP, Glatstein E. Preoperative and postoperative radiation therapy of soft tissue sarcomas of the extremities. *Surgical Oncology Clinics of North America* 1993; 2: 577-588.
19. Barkley HT, Martin RG, Romsdahl MM, et al. Treatment of soft tissue sarcomas by preoperative irradiation and conservative surgical resection. *Int J Radiat Oncol Biol Phys* 1988; 14: 693.
20. Enneking WF, McAuliffe JA. Adjunctive preoperative radiation therapy in treatment of soft tissue sarcomas: A preliminary report. *Cancer Treat Symposia* 1985; 3:37.
21. Suit HD,Willett CG. Radiation therapy of sarcomas of the soft tissues. In Pinedo HM Verweij J, Suit HD (eds): *Soft Tissue Sarcomas: New Developments in the multidisciplinary Approach to Treatment.* Boston, Kluwer, 1991.
22. Potter DA, Glenn J, Kinsella T, et al. Highgrade soft tissue sarcomas of the extremities. *Cancer* 1986; 58: 190.
23. Rosenberg SA, Tepper J, Glatstein E, et al. The treatment of soft tissue sarcomas of the extre mities: Prospective randomized evaluations of (1) limb-sparinc y surgery plus radiation therapy compared with amputation and (2) the role of adjuvant chemotherapy. *Ann Surg* 1982; 196: 305.
24. Kaufman N. Role of Brachytherapy and its complications in limb-preserving treatment of soft tissue sarcomas *Surgical Oncology Clinics of North America* 1993; 2: 589 -609.
25. Paterson R, Parker HM. A dosage system for interstitial radium therapy. *Br J Radiol* 1938; 11: 253.
26. Glasser 0, Quimby EH, Taylor LS et al. *Physical foundations of Radiology,* ed 3. New york, Harper and Row, 1961, p. 503.
27. Elias A, Ryan L, Sulkes A, et al. Response to mesna, doxorubicin, ifosfamide, and dacarbazine in 108 patients with metastatic or unresectable sarcoma and no prior chemotherapy. *Clin Oncol* 1989; 7: 1208.
28. Wanebo HJ, Temple WJ, Popp MB, et al. Preoperative regional therapy for extremity sarcoma: A tricenter update 1995; *Cancer* 75;9: 2299-2306.
29. Eilber FR, Eckardt JJ, Rosen G et al. Neoadjuvant chemotherapy and radiotherapy in the multidisciplinary management of soft tissue sarcomas of the extremity. *Surgical Oncology Clinics of NorthAmerica* 1993; 2:611 -620.
30. Putnam JB, Roth JA. Resection of sarcomatous pulmonary metastases *Surg Onc Clinics of N.Amer* 1993; 4: 673-691.
31. Snyder CL, Saltzman DA, F arrell K L, et al. A new approach to the resection of pulmonary osteosarcoma metastases: Results of aggressive metastasectomy. *Clin Orthop* 1991; 270: 247-253.
32. Casson AG, Putnam JB, Natarajan G, et al. Five-year survival after pulmonary metastasectomy for adult soft tissue sarcoma. *Cancer* 1992; 69: 662-668.
33. Meyer WH, Schell MJ, Kumar AP, et al. Thoracotomy for pulmonary metastatic osteosarcoma: an analysis of prognostic indicators of survival. *Cancer* 1987; 59: 374-379.

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Sarcoma of Bone

Richard M. Terek, MD

Bone tumors are challenging problems to treat because they are rare, can present subtly, have unusual and unpredictable behaviors, and can be lethal. Their treatment, moreover, can result in significant changes in bodily form and function. The management of bone sarcoma of the extremities presents a challenging array of oncologic and reconstructive issues to the muculoskeletal oncologist. This article will review the classification of bone tumors, radiology, clinical presentation, staging, and treatment - emphasizing multimodality treatment of osteogenic and Ewing sarcoma.

Clinical Presentation and Evaluation

The vast majority of patients I see present with either pain or a lesion detected incidentally on radiographs taken after a minor injury. Occasionally patients with bone tumors present with a pathological fracture or a mass. Radiology plays a key role in the initial assessment. Although bone tumors can be classified according to the primary tissue type (fibrous, cartilaginous, bone forming, cystic), the key decision is whether the lesion is benign and inactive, or is active and requires further evaluation and treatment. A fibrous cortical defect is commonly seen in adolescents, yet is virtually never seen in adults. These are self-healing lesions which ordinarily do not require treatment or even follow-up radiographs. If large enough, they can cause pathological fracture and occasionally require bone grafting. Pain as a symptom is not particularly helpful since there are many more common causes of musculoskeletal pain than a neoplasm. Nevertheless, neoplasm should be on the differential diagnosis for any patient presenting with pain or symptoms which may be due to a mass effect, particularly in children. Patients should be questioned about night pain, which suggests pain of nonmechanical etiology. Clinical evaluation should consist of a complete history and physical examination. Family and past medical history should be carefully documented since advances in molecular genetics have identified cancer syndromes in patients and families with multiple cancers. A history of cancer in an adult increases the possibility of a bone metastasis, although a bone metastasis may also be the presentation of an occult malignancy. Evaluation should proceed with plain radiography for patients presenting with extremity pain or dysfunction. Radiography may reveal a soft tissue mass or abnormality of the bone.

Abbreviations Used

AJCC	American Joint Commision on Cancer
CBC	Complete blood count
CT	Computed tomography
LDH	Lactic dehydrogenase
MRI	Magnetic resonance imaging
MSTS	Musculoskeletal Tumor Society
NIH	National Institutes of Health

Benign Bone Tumors

- Osteomyelitis
- Myositis Ossificans
- Simple Bone Cyst
- Osteoid Osteoma
- Osteoblastoma
- Aneurysmal Bone Cyst
- Giant Cell Tumor
- Hemangioma
- Enchondroma
- Osteochondroma
- Chondroblastoma
- Nonossifying Fibroma
- Fibrous Dysplasia
- Eosinophilic Granuloma

Table 1

Radiography

Radiographs of good quality and of multiple views need to be evaluated. Although many lesions are obvious because they destroy or alter the shape of the bone, the findings can be subtle, particularly for rapidly growing malignancies which may only cause a slight periosteal reaction or slight alteration in bone density. Many radiographic features of malignancy resemble those found with infection, whch leads to the cardinal rule of culturing all biopsies. A differential diagnosis can be formed based on the age of the patient, the location of the lesion in the bone (diaphyseal, metaphyseal, epiphyseal, intramedulary, surface), the effect of the lesion on the bone, the reaction of the surrounding bone to the lesion, and the internal characteristics of the lesion itself (Tables 1 and 2). Osteosarcoma and Ewing sarcoma usually occur in children whereas chondrosarcoma usually occur in adults. Some tumors characteriscally occur in one part of the bone. Osteosarcoma is usually a metaphyseal tumor whereas Ewing sarcoma is classically a diaphyseal lesion. The effect of the lesion on the bone and the host bone reaction signal whether the lesion is most likely benign or malignant. Poorly defined lesions with a wide zone of transition, lytic, destructive lesions, cordical breakthrough, and periosteal reaction are all signs of an aggressive, potentially malignant lesion. Well-defined lesions surrounded by a rim of sclerosis are more likely to be benign. Finally, some lesions, such as an osteochondroma, have a classic appearance and shape. Others have characteristic internal features such as the ground glass appearance of fibrous dysplasia. Lesions which appear ag-

Malignant Bone Tumors

- Osteogenic Sarcoma
- Ewing Sarcoma
- Chondrosarcoma
- Adamantinoma
- Malignant Fibrous Histiocytoma
- Lymphoma
- Myeloma

Table 2

Clinical-Pathologic Staging

Benign	Malignant
•1 Latent	• I Low Grade
•2 Active	A Intracompartmental
•3 Aggressive	B Extracompartmental
	• II High Grade
	A Intracompartmental
	B Extracompartmetnal
	• III Metastatic

Table 3

gressive, benign-appearing lesions which are painful, and large lesions which may cause a fracture should be biopsied (and cultured). Many lesions can be followed radiographically if they are probably benign, although one risks failing to diagnosis a lesion which requires treatment. On the other hand, bone biopsies are not innocuous: one possible complication is fracture. Which lesions should be biopsied, which ignored, and which followed is a difficult clinical decision.

If one suspects a lesion but radiographs appear normal, a bone scan can be invaluable to locate an abnormality - particularly with children, who cannot always localize their pain or may have pain referred from another location. They may present with gait abnormalities or simply refusal to move a limb. A bone scan can help distinguish a spine from a pelvis or hip lesion, which can then be further evaluated with a CT or MRI scan. Of course, a normal bone scan does not guarantee that there is no lesion, and serial studies may be necessary.

Staging

The purpose of staging is to give a prognosis to the patient and to guide treatment. This requires accurate histologic diagnosis with respect to histologic subtype and grade, and a determination of the extent of disease. There are two staging systems for bone sarcomas: the American Joint Commission on Cancer (AJCC) system[1] and Muscuuuuloskeletal Tumor Society (MSTS) system.[3,4] (Table 3) Both systems divide tumors into benign and malignant. The MSTS system has three stages for benign lesions; the AJCC system has one. The AJCC uses the same variables as the MSTS for malignant tumors, but weights them differently, and distinguishes between nodal and distant metastases.

In the MSTS system, benign tumors are classified into stages 1, 2, and 3. The system attempts to integrate clinical, histologic, and imaging characteristics - thereby ranking tumors into increasing stages of aggressiveness. Staging of malignant tumors is based on grade, anatomic extent, and presence or absence of distant metastasis. Other pathologic variables and molecular markers have been identified as having prognostic significance but have not been incorporated into the staging system. Malignant tumors are divided into low (stage I) and high (stage II) grade tumors, based on histologic criteria. Tumors are further classified by anatomic extent into intracompartmental (A) and extracompartmental(B). Anatomic extent is analogous to size, which is used in staging other tumors. Stage III patients have metastatic disease. Usually a differential diagnosis can be developed based on the plain radiographs and the age of the patients. Benign-appearing lesions that are asymptomatic, stage 1, can be observed. Benign, active or aggressive lesions, stages 2 and 3, will often need to be imaged with CR or MRI to obtain additional data which may help rule out a malignancy and aid in preoperative planning. For example, a giant cell tumor which has completed eroded the cortex and has an extraosseous mass will usually need to be resected, whereas a lesion with an intact shell of bone could potentially be treated with an intralesional procedure. If metastases are present, they are usually in the lungs. Staging studies for patients with malignant disease consist of chest radiographs and chest CT scan, radiograph of the involved bone, MRI scan of the involved bone, and bone scintigraphy to detect skip lesions and distant bone metastases. CT scan may be more useful for surface lesions involving the cortex. Clinical evaluation of lymph nodes is usually adequate, since nodal metastases from a bone tumor are rare. Local imaging should be performed before the biopsy, although evaluation for metastases can wait until after a malignancy has been diagnosed. The following laboratory studies are also useful: CBC and sedimentation rate, serum calcium, lactic dehydrogenase (LDH), and alkaline phosphatase. The sedimentation rate may be elevated in patients with both osteomyelitis and Ewing sarcoma.[6] The level of elevation of the LDH and alkaline phosphatase has been shown to correlate with survival in Ewing sarcoma and osteogenic sarcoma respectively.[14,18] Patients with a presumed giant cell tumor may actually have a brown tumor of hyperparathyroidism; these two entities may be difficult to distinguish histologically. If serum calcium is elevated, parathyroid hormone level should be checked. In adults with bone pain and normal radiographs, serum protein electrophoresis should be ordered, since myeloma is the most common primary bone tumor in adults and bone scans are normal half the time in patients with myeloma or plasmacytoma.

Biopsy

Although a biopsy may seem a minor procedure, a poorly performed biopsy can have devastating consequences. Biopsies can be either needle biopsies or open incisional biopsies. There are advantages and disadvantages to each. Open biopsy yields greater diagnostic certainty. The incision should be placed longitudinally, in a place where it can be excised en bloc with the tumor at the time of resection. There should be no dissection of structures; the biopsy should be *through* muscle which can be resected with the specimen and will contain any tumor spillage from the biopsy, rather than between muscles, which can result in extensive contamination. The tumor should be biopsied through the compartment in which it has arisen so as not to contaminate additional structures. It is important not to contaminate major vessels and nerves since this may preclude a limb salvage procedure. If a soft tissue mass is present, there is no need to make a hole in the bone. If the cortex and intramedulary contents must be sampled, the hole should be round, placed on the compression side of the bone if possible, and care taken to biopsy a representative portion of the tumor. The interface between the host bone and the lesion can be the most informative, whereas the central part of the lesion may be necrotic and nondiagnostic. Intraoperative frozen pathology should be obtained to ensure that diagnostic tissue has been obtained. Preoperative discussion with the pathologist is useful to ensure that tissue is processed for the appropriate studies, which may include electron microscopy, immunohistochemistry, and cytogenetics. Cytogenetics, which requires fresh tissue, cannot be performed retrospectively after tissue has been fixed in formalin. Tissue should also be sent for aerobic, anaerobic, fungal, and mycobacterial cultures. Careful hemostasis should be obtained prior to closure to minimize contamination. Sometimes the hole must be filled with bone cement or thrombin-soaked gel foam to control bleeding. If a drain is used, it should be placed in line with and close to the biopsy incision; the drain site should be excised along with the biopsy tract at the time of resection. After biopsy, the limb may need to be protected in a cast to prevent fracture, or the patient may need to use crutches and limit weight-bearing.

Multi-agent chemotherapy and limb salvage surgery are two major advances which have occurred over the last twenty years in the treatment of primary bone sarcoma. Limb salvage as an alternative to amputation results in improved quality of life without a compromise in cure.

Treatment of Benign Bone Tumors

The treatment of benign bone tumors consists of observation for some stage I lesions, and an intralesional procedure for most other benign lesions. Intralesional procedures are used for giant cell tumors, aneurysmal bone cysts, some low grade chondrosarcomas, and unicameral bone cysts. Intralesional surgery consists of curettage to remove gross tumor and a variety of adjuvants to treat microscopic disease. The specific combination and use of adjuvants requires an understanding of the bioloy of each of the specific tumors and an understanding of the limitations and complications of the adjuvant treatments. Adjuvants consist of mechanical burring, phenol cauterization, cyrosurgery, and cementation - techniques which reduce the local recurrence rate by extending the margin. After treating these cavitary lesions, reconstruction is performed with bone cementation or grafting, sometimes with internal fixation. Benign surface lesions such as osteochondromas can be simply excised with a small margin of normal tissue.

If there has been advanced bone destruction by a benign process (sometimes the case with giant cell tumor of the distal radius or femur), it may be better to excise the segment of bone containing the lesion, rather than trying to perform an intralesional procedure. Both techniques have proponents.[13,24] If excision is performed, reconstruction can be performed with allograft[21] or autograft. Autografts can be vascularized[7,15] or not.[9] Allografts are obtained from commercial bone banks which match the graft to the size of the patient's bone. The sterile grafts, harvested in the operating room, are preserved by deep freezing, which almost universally eliminates an immunologic response to the bone transplant and obviates the need for immunosuppressive drugs. Bone banks accredited by the American Association of Tissue Banks should be used to minimize the chance of disease transmission, which is about the same as the risks associated with a blood transfusion if the appropriate guidelines are followed.

Treatment of Malignant Bone Tumors

Surgical margins are defined as intralesions, marginal, wide and radical. The treatment of malignant tumors consists of wide excision for stage I tumors and wide excision plus adjuvant chemotherapy for most stage II tumors. Wide excision is the removal of the tumor with a surrounding cuff of normal tissue. No tumor should be visualized during the operation. If the tumor does not extend into the joint, an intraarticular resection can be performed. If the tumor is into or too close to the joint, an en bloc resection of the joint and tumor is necessary.

Osteogenic sarcoma was treated with amputation prior to the 1970s and long-term cure rates were less than

20%.[10] In the 1970s chemotherapy was introduced for treatment of this disease; the overall cure rate is now 77%.[14] After the patient is fully staged and a diagnosis made by biopsy, chemotherapy is administered for two cycles prior to surgery. This precedent was set when it took months to prepare a custom endoprosthesis for limb salvage procedures.[12] In addition, a treatment philosophy of tailoring the chemotherapy agents based on the amount of necrosis found in the resected specimen was adopted since the response to chemotherapy (i.e., necrosis in the resected specimen) is the most important prognostic variable.[17] Preoperative chemotherapy also shrinks tumors, thereby making resections easier and sometimes feasible when they would not have otherwise been. Chemotherapy also treats immediately the micrometastatic disease that most patients have at presentation.

The surgical treatment of osteogenic sarcoma consists of wide excision and reconstruction.[12] Prior to the use of adjuvant chemotherapy, radical resection was advised for high grade malignancies. Radical resection is the removal of the entire anatomical compartment containing the tumor. This can be achieved by compartment resection or amputation at the level of the joint above the lesion. A multi-institutional study conducted during the transition period from amputation to limb salvage evaluated the effect of limb salvage on survival: there was no statistical difference in survival between patients with stage IIB osteosacroma of the distal femur treated with limb salvage (wide excision), above knee amputation (wide amputation), and hip disarticulation (radical amputation).[20] An NIH consensus conference on osteosarcoma concluded that most patients should be treated with a limb salvage operation.[2] Contraindications include major neurovascular involvement and in the lower extremity, limb length discrepancy. In the upper extremity limb length discrepancy is less important. A short arm which allows prehensile activity is without question superior to an amputation and a prosthesis.

The reconstruction of skeletal defects after tumor resection can be performed with allografts, endoprostheses (artificial joints), allograft/endoprosthetic composites, and vascularized and nonvascularized autografts. Soft tissue reconstruction can involve tendon transfers, nerve grafts, local muscle flaps, vascular grafts, and free tissue gransfer. The goal is to preserve a functioning limb with mobile joints, although sometimes fusion of a joint will give a better functional result if sufficient muscles do not remain to actively move and stabilize the joint.

Radiation therapy is used for Ewing sarcoma, myeloma, lymphoma, and metastatic disease. It should not be used for benign tumors, since a radiation-induced sarcoma, which is difficult to cure, can result. Ewing sacrcoma is the second most common primary bone tumor in patients younger than 21 years of age. The incidence is low (2-3 cases occur per million people younger than 21). The majority of cases occur in the pelvis and femur.[6] Treatment started with radiation therapy for local treatment. The tumor was found to be radiosensitive although the cure rate with radiation alone was 10%. Chemotherapy was developed in the 1960s. Vincristine, actinomycin-D, cytoxan, and dactinomycin form the core of current chemotherapy protocols, although newer agents are being tested.[6] The role of surgery for local treatment remains controversial.[5] Excision of expendable bones is accepted; however, a debate over the optimal treatment for other sites continues. Some investigators recommend radiation alone, some surgery alone, and some both modalities. No prospective studies have been done to answer this question. Restrospective studies indicate a survival advantage for patients who have surgery as part of their treatment for some,[16] but not all, sites. However, their improved survival may be related to their having resectable lesions.[19] Radiation alone for local treatment does result in local recurrences and has its own set of local com-

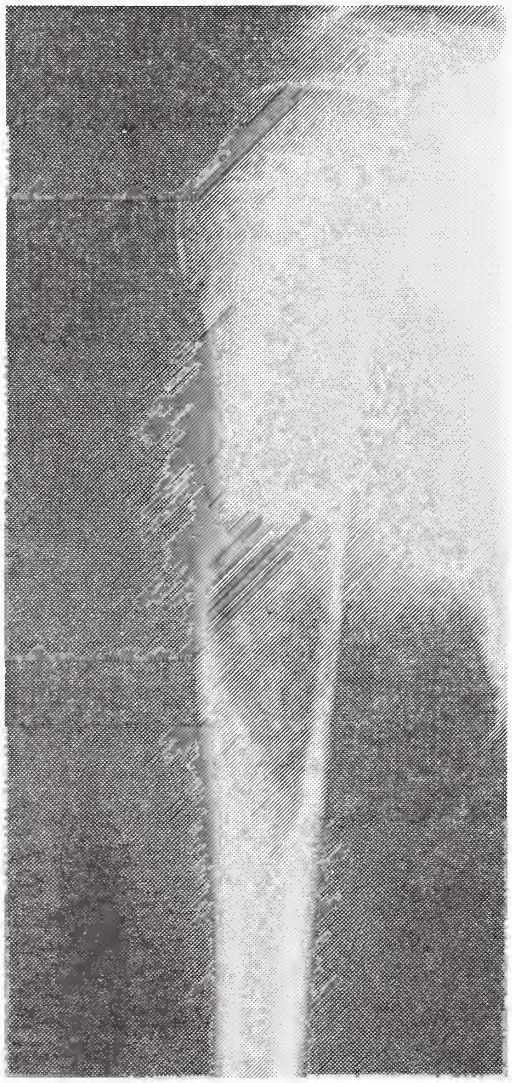

Figure 1 A: Radiograph of the humerus demonstrates a pathological fracture through a poorly defined lytic lesion in the proximal humerus of a skeletally immature patient.

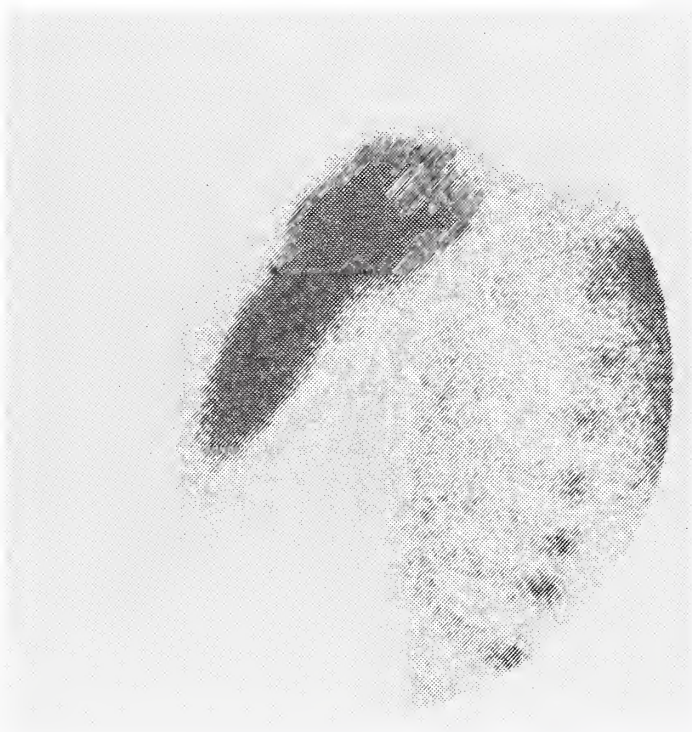

Figure 1B: Bone scan shows increased activity in the right humerus.

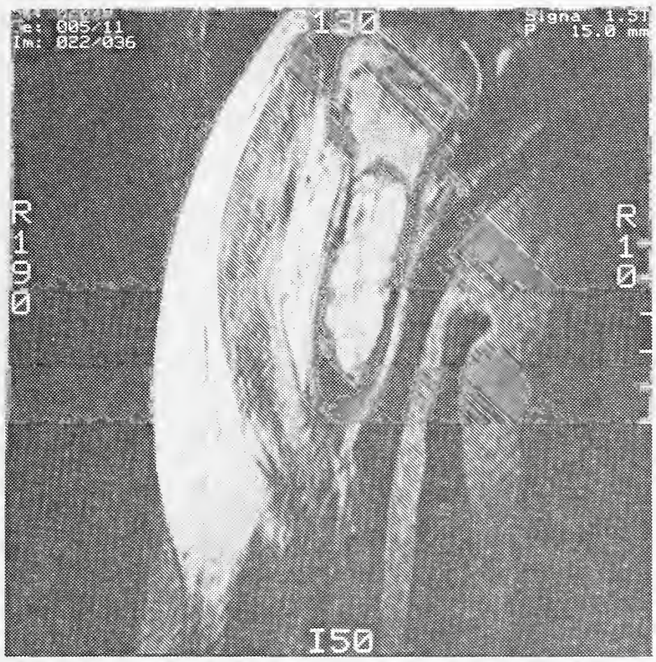

Figure 1C: MRI demonstrates the intramedulary extent of the tumor and the surrounding soft tissue mass in the upper humerus.

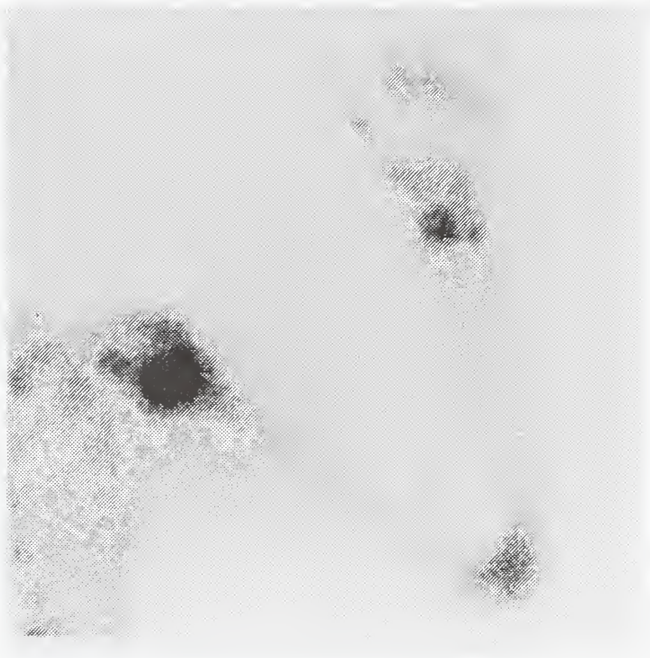

Figure 1D: Folow-up bone scan after 2 months of chemotherapy shows decreased activity.

plications, ranging from joint contractures[8] to secondary sarcomas, so there is a trend toward resecting most lesions and using radiotherapy as a local adjuvant for positive margins or high risk tumors.[22] The principles of surgical resection are the same as for osteogenic sarcoma. [11] Many of these lesions are diaphyseal femur lesions and intercalary allografts are a good joint-sparing reconstructive option.

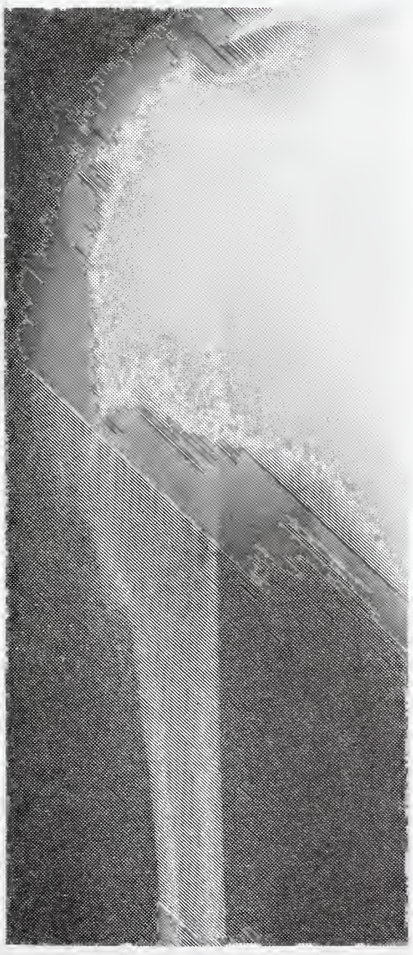

Figure 1E: Preoperative radiograph demonstrates the healed fracture.

Figure 1F: Postoperative radiograph demonstrates reconstruction with an endoprosthetic allograft composite.

Chondrosarcoma are graded histologically as 1, 2, and 3. Chondrosarcoma are an exception to the rule that chemotherapy is used for high grade bone sarcomas because they are resistant to chemotherapy. This may be related to expression of the multi-drug resistance gene and p-glycoprotein.[23] The treatment of high grade chondrosarcoma is surgical resection.

Case Example

A 12 year-old right-hand dominant female presented with a 2-month history of constant right upper arm pain acutely exacerbated when she heard a crack while arm-wrestling. There were no constitutional symptoms and, prior to the injury, no difficulty with use of the right arm. Family history was noncontributory. Figure 1A shows a radiograph of the proximal humerus of a skeletally immature individual with a nondisplaced fracture through a lytic lesion in the metaphysis and diaphysis. The margins of the lesion are poorly defined; the cortex is expanded and thinned, and there is periosteal reaction. The differential diagnosis based on the age of the patient and appearance of the lesion includes Ewing sarcoma, osteogenic sarcoma, infection, aneurysmal bone

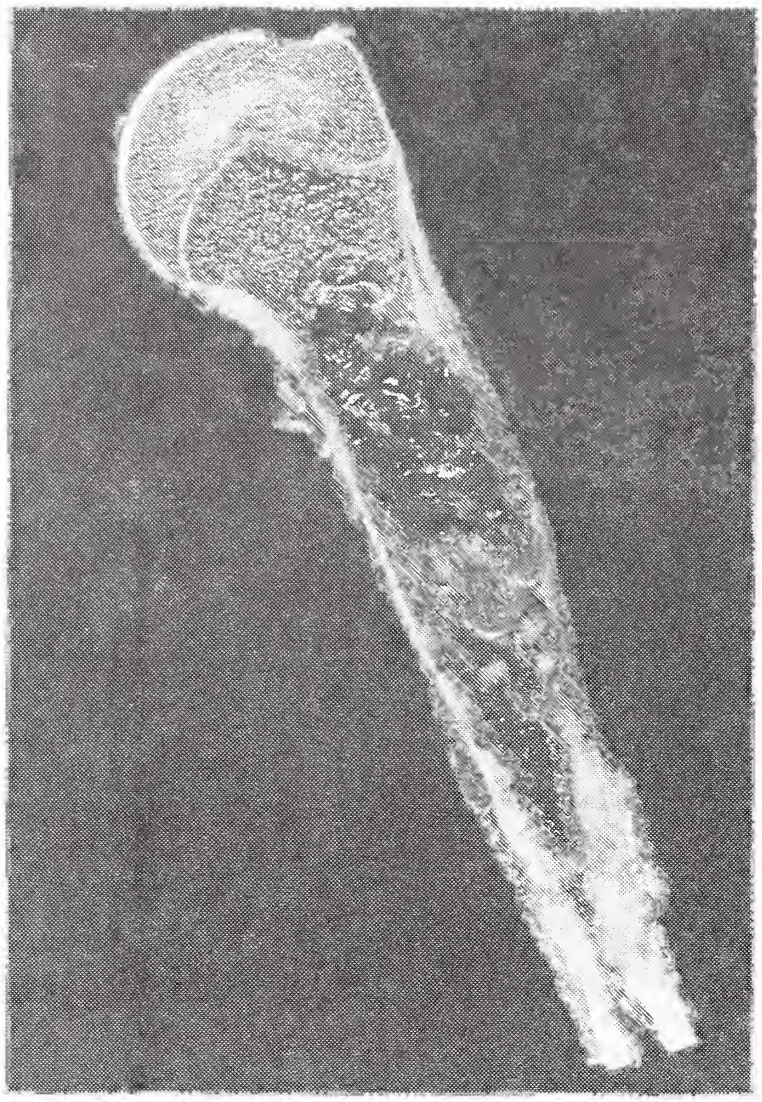

Figure 1G: Gross pathology of the resected humerus after removal of the soft tissues shows the tumor extending to the growth plate.

cyst, and eosinophilic granuloma. Figure 1B shows a bone scan which demonstrates increased uptake thorughout a large portion of the proximal humerus. The MRI scan (figure 1C) demonstrates the intramedullary extent of the tumor as well as a surrounding soft tissue mass. Laboratory studies revealed an alkaline phosphatase level of 176 IU/L (Normal 42-121 for adults, upper limit of normal for children, 350) and an LDH of 114 IU/L(normal 91-180). An open biopsy was performed, revealing a high grade osteogenic sarcoma. The patient was started on chemotherapy according to a Pediatric Oncology Group protocol (2 cycles of ifosfamide, doxorubicin, and methoxetrate given over 9 weeks). Preoperative bone scan (Figure 1D) demonstrates decreased uptake, indicating responsiveness to chemotherapy. Preoperative radiograph (Figure 1E) shows healing of the fracture, a good prosnostic feature. A limb salvage operation consisting of an intra-articular wide excision of the proximal 19 cm of the humerus was performed with preservation of the axillary, radial, median, and ulnar nerves. Reconstruation (Figure 1F) was performed with an allograft/endoprosthetic composite. The allograft allows for reattachment of the rotator cuff, deltoid, pectoralis major, teres major, and latissimus dorsi muscles while the endoprosthesis protects the allograft from fracture. Postoperatively the soft tissue repair was protected in an airplane splint and chemotherapy was resumed. Examination of the resected specimen (Figure 1G) revealed over 90% tumor necrosis, which protends a good prognosis for cure.

Summary

Multiagent chemotherapy and limb salvage surgery are two major advances which have occurred over the last twenty years in the treatment of primary bone sarcoma. Limb salvage as an alternative to amputation results in improved quality of life without a compromise in cure. The complications of limb salvage continue to decrease while the durability of the reconstructions continues to improve. Chemotherapy has dramatically improved long-term survival, particularly in children.

References

1. Bone, in Beahrs OH, Henson DE, Hutter RVP, Kennedy BJ (eds.): *Manual for Staging of Cancer.* v. 14, Philadelphia, JB Lippincott Company, 1992, 127-129.
2. Consensus Conference. Limb-sparing treatment of adult soft-tisue sarcomas and osteosarcomas. *JAMA* 1985;254:1791-1794.
3. Enneking WF. A system of staging musculoskeletal neoplasms. *Clin Orthop* 1986;204:9-24.
4. Enneking WF, Spanier SS, Goodman MA. A system for the surgical staging of smuculoskeletal sarcomas. *Clin Orthop* 1980;153:106-120.
5. Horowitz ME, Neff JR, Kun LE. Ewing's sarcoma. Radiotherapy verwsus surgery for local control. *Pediatric Clinics of North America* 1991;38:365-380.
6. Horowitz ME, Tsokos MG, DeLaney TF. Ewing's sarcoma. *CA-A Cancer Journal for Clinicians* 1992;42:300-320.
7. Leung PC, Chan KT. Giant cell tumor of the distal end of the radius treated by the resection and free vascularized iliac crest graft. *Clin Orthop* 19856;202:232-236.
8. Lewis RJ, Marcove RC, Rosen G. Functional effects of radiation therapy. *J Bone Joint Surg* 1977;59A:325-331.
9. Mack GR, Lichtman DM, Macdonald RT. Fibular autografts for distal defects of the radius. *J Hand Surg* 1979;4(6):576-583.
10. Marcove R, Haych JV, et al. Osteogenic sarcoma under the age of twenty-one: A review of 145 operative cases. *J Bone Joint Surg* 1970;52:411-492.
11. Marcove, RC, Rosen G. Radical en bloc excision of Ewing's sarcoma. *Clinical Orthopedics and Related Research* 1980;153:86-91.
12. Marcove, RC, Rosen G. En bloc resections for osteogenic sarcoma. *Cancer* 1980;45:3040-3044.
13. Marcove RC, Weis LD, Vaghaiwalla MR, et al. Cryosurgery in the treatment of giant cell tumors of Cone - a report of 52 consecutive cases. *Cancer* 1978;41:957-969.
14. Meyers RL, Heller F, Healey J, et al. Chemotherapy for nonmetastatic osteogenic sarcoma: The Memorial Sloan-Kettering experience. *J Clin Oncol* 1992;10:4-14.
15. Pho RWH. Malignant giant-cell tumor of the distal end of the radius treated by a free vascularized fibular transplant. *J Bone and Joint Surg* 1981;63-A:877-884.
16. Pritchard DJ, Dahlin DC, Dauphine RT et al. Ewing's sarcoma: A clinicopathological and statistical analysis of patients surviving five years or longer. *J Bone Joint Surg* 1975;57A:10-15.
17. Rosen G, Caparros B, Huvos AG, et al. Selection of postoperative adjuvant

chemotherapy based on the response of the primary tumor to preoperative chemotherapy. *Cancer* 49:1221-1230, 1982.
18. Rosen G, Caparros B, Nirenberg A, et al. Ewing's sarcoma: Ten year experience with adjuvant chemotherapy. *Cancer* 1981;47:2204-2213.
19. Sailer SL, Harmon DC, Mankin HJ, et al. Ewing's sarcoma: Surgical resection as a prognostic factor. *Int J of Radiation Oncology, Biology, Physics* 1988;15:43-52.
20. Simon MA, Aschliman MA, Thomas N, et al. Limb-salvage treatment versus amputation for osteosarcoma of the distal end of the femur. *J Bone and Joint Surg* 1985;68A:1331-1337.
21. Smith RI, Mankin, HJ. Allograft replacement of distal radius for gian cell tumor. *J Hand Surg* 1977;2(4):299-309.
22. Terek RM, Brien EW, Marcove RC, et al. Long-term survival and function after surgery for Ewing tumor of the femur. in Tan SK (Ed). *ISOLS Limb Salvage, Current Trends, Proceedings 7th International Symposium.* v.17:413-418,1993.
24. Vander Griend RA, Funderburk CH. The treatment of giant-cell tumors of the distal part of the radius. *J Bone and Joint Surg* 1993;75-A:899-908.

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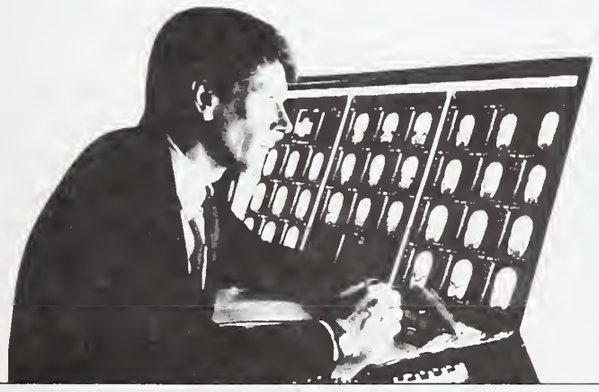

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Head and Neck Sarcoma

Harold J. Wanebo, MD

Sarcomas of the head and neck are rare tumors constituting approximately 15% of the 6000 new cases of sarcomas diagnosed yearly, and approximately l-5% of tumors in this region.[1-10] These tumors differ widely according to their location in the head and neck, their size, their tissue type and their grade.[7,11,12] Predisposing conditions may include prior irradiation which has an associative or causal relationship to development of various malignancies: osteo sarcoma, malignant fibrous histiocytoma, peripheral nerve tumors of soft tissues.[3] Familial relationships include osteosarcoma and malignant transformation of neurofibromas to high-grade neurofibrosarcomas in one-third of patients with Von Reckling-hausen's disease. Other familial linkage includes lipomatoses, and possible cutaneous and mucosal smooth muscle tumors.[13] Although discrete tumors are the rule, multifocality or multicentricity is exhibited by almost all neurofibromas, over one-half of angiosarcomas and 10% of leiomyosarcomas.[13]

Head and neck sarcomas have a biphasic chronologic presentation with approximately 10-20% presenting in children and the rest in adults, with the median of 45-50. In children, 80% are variants of embryonal rhabdomyosarcoma. In older patients (>55 yrs) unique lesions include angiosarcomas and liposarcomas; among younger adults (<35 yrs.), rhabdomyosarcomas and low-grade desmoid fibrosarcoma predominate.[4,13] Commonly presenting symptoms include a mass lesion, pain, skin changes, or a dysfunctional disturbance, i.e. visual change, nasal obstruction, voice change, etc. Common sites include the neck (28% of cases), face and forehead (20%), maxilla/alveolar ridge (15%), scalp, mandible (10% each), paranasal sinus, oral cavity, and pharynx and larynx (approximately 10-15%). The anterior and posterior neck are major sites for nearly 5% of fibrosarcomas, including low-grade desmoid fibrosarcomas, malignant peripheral nerve tumors, rhabdomyosarcomas, tenosynovial sarcomas. Face and scalp are the most common sites of vascular neoplasms such as angiosarcomas and hemangiopericytoma. Sarcomas of the palate and gum line are commonly fibrosarcomas. The maxillary sinus or nasal cavity are common sites for fibrous histiocytomas and embryonal rhabdomyosarcomas.[14] The tumor size recorded in the Head and Neck Sarcoma Registry was <3cm in 33 patients, 3-5cm in 64 patients and >5cm in 41 patients. The median size was 4cm.8

Abbreviations Used	
MFH	Malignant fibrous histiocytoma
NED	No evidence of disease

... unfavorable prognostic factors included tumor invasion at the surgical margin, extracompartmental status, tumor diameter greater than 5 cm and inadequacy of excision. Primary tumor factors of necrosis, high mitotic count, histologically undifferentiated tumors and blood vessel invasion were also related to poor prognosis.

Diagnosis requires careful clinical examination and use of CT scan and/or MRI of the head and neck, chest x-ray and bone scan to exclude distant disease. The CT scan is useful for determining bone involvement, intracranial extension and response to therapy. MRI provides excellent soft-tissue detail and multiplanar images and is useful for demonstrating intracranial extension of sarcomas arising in the base of the skull, infratemporal fossa and perinasal sinuses. Although initial tissue biopsy by fine needle aspiration cytology may point to the diagnosis and suggest a tumor of mesodermal origin rather than carcinoma, a definitive tissue diagnosis is required. Hence, an open biopsy will be needed. An adequate amount of tissue is needed for the pathologist to undertake a standard hematoxylin and eosin examination, as well as tissue for electronmicroscopy and special immunohistologic procedures. This may be required in lesions that appear anaplastic and in which the true basic tumor type. i.e. carcinoma, melanoma, sarcoma, or even lymphoma is in question. The pathologist should make every effort to establish the grade (high or low), and to indicate tissue type. Stage is determined by the tumor grade, but also by the presence of nodal metastases (uncommon, <10%) or distant disease. Extension into bone or inability to achieve a complete resection because of involvement of vital structures or presence of recurrence are high-risk features mitigating against long-term control. Pathologic features which define high-risk lesions include

TABLE I

Author	Year	Patients	Grade	Resected(%)	Adjuvant Therapy(%)	Survival(%) 5 year Mean
Goepfert	1977	23	III 8 (35%) II 7 (30%) I 6 (26%) n.s 2 (9%)	91	100	n.s.
Farr	1981	242 (50% pediatric)	n.s.	n.s	n.s	32
Graeger	1985	53	n.s.	n.s	n.s	54 DFS
Wever	1986	188	III 126 (67%)	69	56	27 NED 2 LWD
Figueiredo	1988	94 (23% pediatric)	n.s	n.s.	n.s.	38
Freedman	1989	352 (23% pediatric)	High 73(49%) Low 68 (19%) n.s. 111 (32%)	82	33	67
Farwood	1990	176	High 104 (59%) Low 72 (41%)	92	n.s	55
Wanebo et al.	1991	214 (9% pediatric)	n.s.	83	59	70
Kraus	1994	50 adult	High 35 Low 25	60	50	71 OS 60 DFS
Tran	1992	164 adult 90M, 74F	High 85(61%) Low 55(39%)	78 Radical - 73 WLE - 27	23	High Grade 31 (27/85) Low Grade 81 (44/55) 66 5yr OS 57 10yr OS

Table 1: n.s. not stated; DFS: disease-free survival; NED: no evidence of disease; LWD: living with disease; OS: overall survival; WLE: wide local excision

size (greater than 5cm), high-grade tumors, a positive margin at resection, extension into bone, the presence of regional metastases, and the presence of recurrence or distant metastases.[13]

In the review of the Head and Neck Sarcoma Registry, soft tissue tumors were the most common type, with bone tumors occurring in approximately 20% of the cases (Table 1). Major types included fibrous tumors [(MFH) malignant fibrous histiocytoma) and fibrosarcomas], tumors of smooth muscle (leiomyosarcoma, about 5%), skeletal muscle tumors, (rhabdomyosarcoma and embryonal rhabdomyosarcoma), tumors of vascular origin (angiosarcomas and hemangiopericytomas-15-20%), neural tumors, (schwannoma, neurofibrosarcoma, approximately 5%). These tumors are considered to be high or intermediate grade level. Low grade tumors included dermatofibrosarcomas protuberans, desmoid tumors, and some other tissue soft sarcomas i.e. fibrosarcomas, liposarcomas. Not listed in this series, but recorded in other series, are tumors of the olfactory gland, esthesioneuroblastoma, neuroblastoma, and orbit (retinoblastoma). Unfortunately, this study contained patients' material submitted from a variety of institutions; and grade was not commonly available.

Treatment

Treatment is dictated by tumor type, stage, location, size, and patient age. A rhabdomyosarcoma in the pediatric age group generally requires combined chemotherapy, radiation, and surgery with emphasis on drug-induced regression and minimal ablative surgical resection. A similar approach might be stated for the patient with the high grade angiosarcoma of the scalp in the elderly male patient in which combined chemoradiation and perhaps more limited resection might be fully equivalent to a radical resection. In the Head and Neck Sarcoma Registry study, resection was performed in 179 of 203 patients (88%) operated for primary sarcoma.[1] In 163 patients, the resection was done with curative intent, all gross disease being removed; the margins were microscopically involved in 17% of these patients. Surgery was primarily wide local excision of variable extent in the 179 patients, and was combined with neck dissection in 15. Specific functional sites requiring resection as dictated by the primary tumor included maxillectomy (27 patients), mandibulectomy (20 patients), orbital exenteration (5), laryngopharyngectomy (5). Adjunctive radiation was given to 58 patients; chemotherapy, to 31; and combined radiation/chemotherapy. to 38 patients. Of the 57 patients with involved margins, 46 were given RT or chemotherapy. In this study the mean survival at 5 years was 70%, at 10 years 55%. There was a trend towards better survival in the pediatric patients. At 45 months the estimated survival was 85% in pediatric patients vs. 72% in adult patients. Although the difference was not significant (p - 0.1), the trend is representative of the improved survival

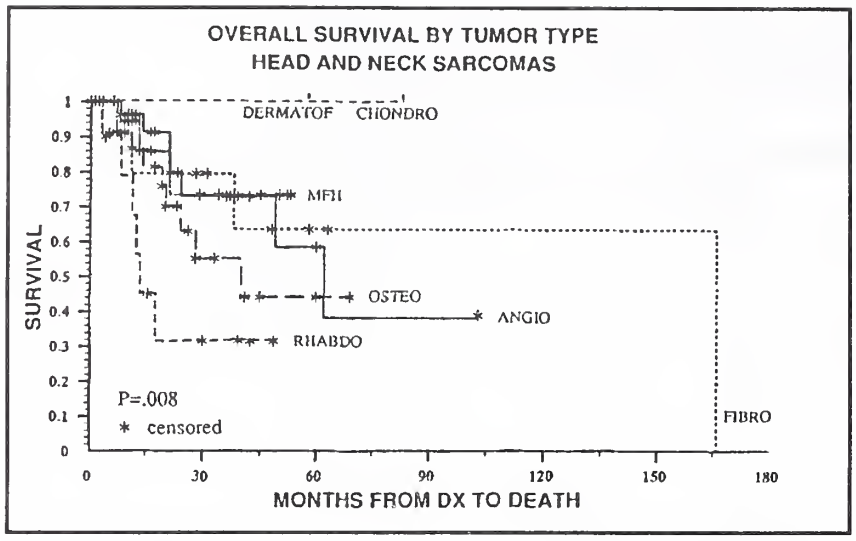

Figure 1: The overall survival differences according to tumor type are shown above. The survival range was highest for patients with dermatofibrosarcoma and chondrosarcoma. Survival was in the intermediate range (62% to 72%) for patients with malignant fibrous histiocytoma and fibrosarcoma, and was poorest (30% to 45%) in patients with osteosarcoma, angiosarcoma, and rhabdomysarcoma.

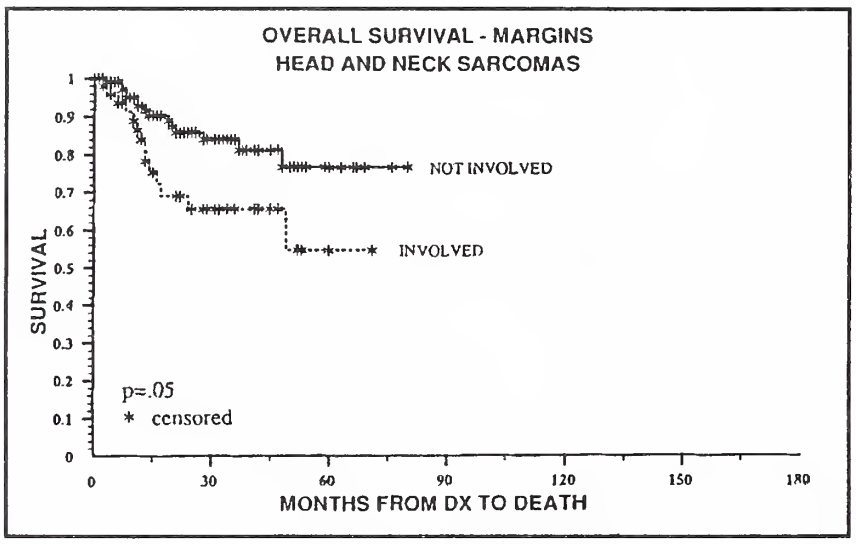

Figure 2: The estimated overall survival after resection showed improved survival in patients whose resection margin was microscopically involved with tumor versus those whose margins were clear. (Kaplan-Meier curve, Gehan-Wilcoxon statistic)

reported in pediatric sarcoma patients vs. unchanged survival in the adult patients.

Although there was an apparent survival trend related to size, i.e. <3 vs >3cm, this difference was not statistically evidenced in this study. In more homogeneous studies (consisting of all high-grade tumors), patients with large tumors have significantly impaired survival compared to those with smaller tumors.[12] In this study, only a limited number of patients had tumor grade assigned; most were given a tumor type. Excellent long-term survival was observed in patients with dermatofibrosarcoma, desmoid tumors, as well as in patients with chondrosarcoma (Fig 1), survival approaching 100%. Generally these tumors are considered low grade. Patients with MFH (malignant fibrous histiocytoma) and fibrosarcoma had intermediate survival of 60-70%. The worst survival was seen in patients with osteosarcoma, angiosarcoma, or rhabdomyosarcoma, in all of whom survival was less than 45%. Another factor in this study was the relationship of survival to margin of resection. In patients whose resectional margin was involved, there was a significant impairment of 5-year survival (55% vs 80%) compared to patients whose margins were not involved, p=<0.05 (Fig. 2). In this study, no statement could be made regarding adjuvant therapy because of the heterogeneous nature of these patients. There was a survival difference in patients who presented with recurrent tumors (impaired survival) vs. those seen with primary tumors, as might be expected. An overview of major reported series is shown in Table 1. This collected group of 1556 patients, enumerated in ten different reports, is representative of the heterogeneous nature of sarcomas as reported in the literature. It also points out the difficulty in summarizing the results from such reports. Four of the ten reports included pediatric patients. Only six reports gave a tumor grade. In four of the largest series, high-grade sarcomas were present in over one-half the patients. The resectability rate ranged from 69-92% and the 5-year survival ranged from 32-71%.

Because of the small numbers of patients and their heterogeneity, head and neck sarcomas do not lend themselves to study by clinical trial; indeed, few studies have included adult sarcomas.[15] In the pediatric group, however, there have been several, well-organized trials in patients with rhabdomyosarcoma and other high-grade tumors.[16-18] Sarcomas of the head and neck appear to have unique characteristics compared to sarcomas at other sites, because of the close involvement with strategic structures and their effect and limitation on treatment. Thus, an embryonal rhabdomyosarcoma in the neck of a child or involving the orbit has a totally different response to treatment than the same type of tumor occurring in less strategic sites (extremities or trunk), where there can be an adequate surgical resection with clear margins without a severe impact on function. Although chemotherapy, and/or radiation with limited surgery can be curative in many pediatric head and neck sarcomas, there are indications that in nonorbital rhabdomyosarcomas that complete resection in addition to chemotherapy provides superior results.[18] The combination of adequate (radical) resection with appropriate reconstruction in lieu of radiation in patients responding to chemotherapy may reduce the incidence of growth retardation, which is a potential hazard of the radiation, and allow for long-term tumor control with preservation of function.[17]

Prognostic Factors

A variety of prognostic factors have been examined which impact on outcome in patients with sarcomas of the head and neck as well as other sites. Herlin et al, examining extremity, trunk, and head and neck tumors, found that unfavorable prognostic factors included tumor invasion at the surgical margin, extra compartmental status, tumor diameter >5cm, and inadequacy of excision.[10] Primary tumor factors of necrosis, high mitotic count, histologically undifferentiated tumors, and blood vessel invasion were also re-

lated to poor prognosis.

Multivariant analysis of these factors showed that local recurrence was related to the quality of surgery, i.e. wide resection with microscopically clear margins, whereas, recurrence with distant metastases was related to tumor size, margin of resection, presence of tumor necrosis and adequacy of excision. This study among others has confirmed the importance of adequacy of excision. In the pediatric head and neck tumors reviewed by Rao and et al., it was observed that surgery alone with gross resection may be sufficient initial therapy in the subset of patients in whom the site and size of tumor permitted wide field resection with clear margins.[18] Chemotherapy and radiation can augment survival in these patients. In the series from the Division of Surgical Oncology, University of Illinois, the disease-free survival at 5 years was 54% after resection.[3] Most patients had wide field resection with radiation and/or chemotherapy being given in selected patients. Survivors were primarily those who had well differentiated or small (<5cm) tumors. In the Mayo Clinic series by Freedman et al.6, the overall survival of patients presenting with localized disease was 68% at 5 years and 60% at 10 years. Surgical resection was the sole method of control in 49%; adjuvant radiation and/or chemotherapy was used in 33%. In this series, 72% were adult and 28% pediatric. Non-orbital rhabdomyosarcoma was the most common type tumor (17%). The poorest results were in patients with angiosarcoma and nonorbital rhabdomyosarcoma. In the study from MD Anderson by Webber et al., of 188 patients 67% were Grade III and 18% were Grade I.[4] Sixty-nine percent of the patients were resected; over half had adjuvant therapy. The authors observed the following: a correlation of survival with size; 5 year survival in patients with tumors <5cm was 49% vs. 30% in patients with tumors >5cm. Also negative margins were associated with improved survival compared to that in patients with positive margins. In this series, tumor size, histologic type, and treatment most effected survival. Fifty-eight of their patients developed recurrence at the primary site, at a median time of 10 months. Of this group, 28% were alive (most NED) and 72% were dead. Among 74 patients who were salvaged for local recurrence a complete response was observed in 16, (mean survival 53 months), partial response in 28, (mean survival 13.5 months), and no response in 30 patient, (mean survival 8 months). Overall, of 188 patients in this series, 51(27%) were NED, 27% are living with disease, 49% died of the disease, 15% died of other causes, and 7% were lost to follow-up.

In the review by Tran et al of 164 patients with head and neck sarcoma, multivariate analysis showed grade, size and surgical margin as independent prognostic factors.[22] Thirty-one percent of patients with high-grade lesions survived versus 81% of low-grade patients. They emphasized the need for complete resection with clear margins and the use of post-op radiotherapy if margins were involved or for high grade tumors. A recent series of 60 patients analyzed by Kraus et al. considered common parameters of histology, size, previous treatment and margins: only margin was associated with local control, whereas grade and margin had impact on survival.[14] In their review of 4 other series, grade, margin and size had a positive impact on survival outcome, but little impact on local failure.

Most authors in these major series recommend a careful preoperative clinical evaluation including a comprehensive histologic review with a statement regarding tumor grade and tissue type, liberal use of ancillary diagnostic pathologic techniques, such as with electronmicroscopy and special staining. The newer molecular biologic techniques for assessing prognostic factors merit exploration and require access to fresh or cryo-preserved tissue.

Clinical staging should include a detailed history and physical exam, the use of careful endoscopic evaluation of the nasal pharynx, posterior pharynx and larynx, and sinuses where appropriate with CT evaluation and attention to evidence of bone destruction and intracranial extension. The presence of distant metastases should be evaluated by chest CT, bone scan, and in most cases probably CT of the abdomen to exclude the uncommon presence of liver metastases. Although adjuvant therapy for adult sarcoma is problematic, there is evidence that in large high grade tumors, the use of preoperative chemo and radiation therapy may reduce tumor size and ensure the likelihood of obtaining clear margins.[22-24] An example might be an esthesioneuroblastoma which because of its site requires a major cranial facial resection with limitations of margins of excision, suggests benefit from adding chemo and radiation to this group.[24] The importance of grading and carefully assessing tumors, i.e. especially soft tissue tumors, such as fibrosarcomas, desmoids, etc., suggests that in patients with large tumors with potential for margin involvement the use of combined radiation might be helpful.[15] Similarly, in patients with angiosarcomas usually occurring in elderly adults, the use of complementary radiation and chemotherapy may reduce both the incidence of recurrences and the size of the surgical resection. The role of adjuvant therapy is not clear because of the absence of clinical trial data supporting its use.[23] Continued studies are warranted.

References

1. Wanebo HJ, Koness RJ, MacFarlane JK, Byers RM, Ellas EG, Spiro RH. Head and Neck Sarcoma:A report of the Head & Neck Registry. *Head & Neck* 1992;14:1-7.
2. Goepfert H. Lindberg RD, Sinkovics JG, Ayala AG. Soft-tissue sarcoma of the head and neck after puberty. *Arch Otolarygol* 1977; 103:365-368.
3. Greager JA, Patel MK, Briele HA, Walker MJ, Das Gupta TK. Soft-tissue sarcomas of the adult head and neck. *Cancer* 1985;56:820-4.
4. Weber RS, Benjamin RS, Peters LJ, et al. Soft-tissue sarcomas of the head and

neck in adolescents and adults. *Am J Surg* 1986; 152:3:86-92.
5. Figueiredo MTA, Marques LA, Campos-Filho N. Soft-tissue sarcomas of the head and neck in adults and children:Experience at a single institution with a review of the literature. *Int J Cancer* 1988; 41: 192-200.
6. Freedman AM, Reiman HM, Woods, JE. Soft-tissue sarcomas of the head and neck. *Am J Surg* 1986;158:367-392.
7. Farwood AI, Hajdu SI, Shin MH, Strong EW: Soft-tissue sarcomas of the head and neck in adults. *Am J Surg* 1990; 160:365-372,
8. Enzinger FM, Wells SW.*Soft Tissue Tumors*. St Louis: CV Mosby Publishers, 1988.
9. Torosian MH, Friedrich C, Godbold J, et al. Soft-tissue sarcomas: Initial characteristics and prognostic factors in patients with and without metastatic disease. *Semin Surg Oncol* 1988; 4:13-9.
10. Herlin P, DeRanieri J, Tanguy A, et al. Prognostic factors in soft-tissue sarcomas. *Cancer* 1989; 63:1437-1451.
11. Mauer HM. Intergoup rhabdomyosarcoma study II: Objectives and study design. *J Pediatr Surg* 1980;15:371-2.
12. Glenn J, Kinsella T, Glatstein E, et al. A randomized, prospective trial of adjuvant chemotherapy in adults with soft- tissue sarcomas of the head and neck, breast, and trunk. *Cancer* 1985;55:1206-1214.
13. Hajdu SI. The role of the pathologist in the management of soft tissue sarcomas of the head and neck. In: Johnnson JT, Didolkar MS. *Head and Neck Cancer* Volume III, Elsevier Science Publishers, Amsterdam, 1993, pp.55-62.
14. Kraus DH, Dubner S, Harrison LB, Strong EW, Hajdu SI, Kher U, Begg C, Brennan MF. Prognostic factors for recurrence and survival in head and neck soft tissue sarcomas. *Cancer* 1994; 74:697-702.
15. Wanebo HJ, Temple W, Popp M, et al. Combination regional therapy for extremity sarcoma: A tri centre study. *Arch Surg* 1990; 125:355-359.
16. Pratt CB, Husta OH, Fleming ID, et al. Coordinated treatment of childhood rhabdomyosarcoma with surgery, radiotherapy and combination chemotherapy. *Cancer Res* 1972; 32:606-610.
17. Donaldson SS. The value of adjuvant chemotherapy in the management of sarcomas of children. *Cancer* 1985; 55:2184-2197.
18. Johnson DG. Trends in surgery for childhood rhabdomyosarcoma. *Cancer* 1975; 35:916-920.
19. Maurer HM. Intergroup rhabdomyosarcoma study: Update, November 1978. *National Cancer Inst Monogr* 1981; 56:61-68.
20. Fromm M, Littman P, Raney RB, et al. Late effects after treatment of twenty children with soft-tissue sarcomas of the head and neck. *Cancer* 1986; 57:2070-2076.
21. Rao BN, Santana VM, Fleming ID, et al. Management and prognosis of head and neck sarcomas. *Am J Surg* 1989; 158:373-377.
22. Tran LM, Mark R, Meier R, et al. Sarcomas of the head and neck. *Cancer* 1992;1992,70:169-177.
23. Mazanet, R, Antman KH. Sarcomas of Soft Tissue and Bone. *Cancer* 1991;68: 463-473.
24. Spaulding, CA, Kranyak MS, Constable, WC, Steward, FM. Esthesioneuroblastoma: a comparison of two treatment eras. *J Radiat Oncol Biol Phys* 1988; 15:581-590.

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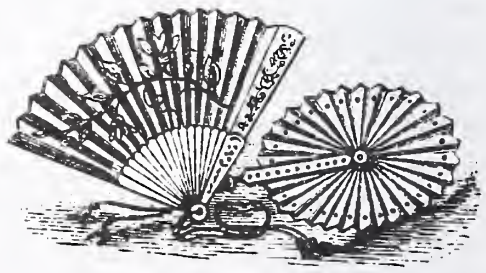

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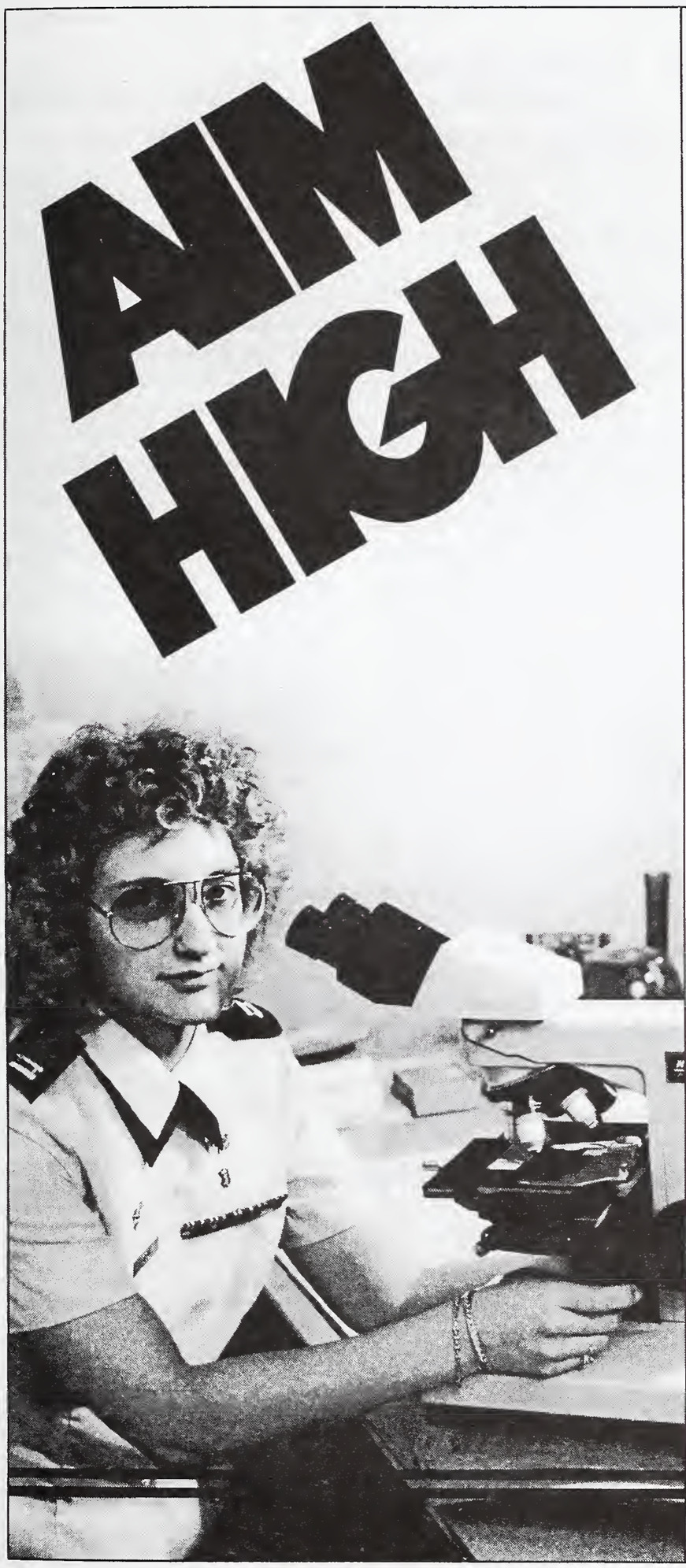

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The Role of Radiation in the Management of Soft Tissue Sarcoma

Li Liu, MD, and Arvin S. Glicksman, MD

Soft tissue sarcomas of extremities

Over 50% of soft tissue sarcomas occur in the extremities, followed in frequency by trunk, retroperitoneum and head and neck.[1,2] These sarcomas account for fewer than 1% of adult tumors (approximately 5,000 per year in the United States). Although there are at least 50 recognized histological patterns, the grade of the tumor and the size appear the most important prognostic factors.

Soft tissue sarcomas remain a therapeutic challenge. Except in the most favorable cases neither surgery nor radiation alone is successful and the role of chemotherapy is still to be determined. This review will discuss the role of radiotherapy in the total management. The challenge remains to achieve successful treatment without loss of function or mutilation and to preserve the quality of life.

Radiotherapy as the sole treatment for lesions in the extremities was reported successful in over 25% of selected cases by Cade in 1950.[3] His prior approach had been extensive surgery. Further experience with radiotherapy with reasonable success for fibrosarcoma was reported by Windeyer at the Middlesex Hospital in London.[4] Tepper at the Massachusetts General Hospital, using doses of over 65 Gy, had quite good control of small lesions (less than 5 cm) but unsatisfactory results for larger lesions.[5]

Current management reflects these contributions. They are particularly relevant in developing treatment strategies at improved function. The integration of surgery and radiation may result in limb preservation without an increased risk of failure to control the tumor. With the increased appreciation of the importance of quality of life, limb-sparing techniques have been employed extensively over the last two decades.

Radiation is a nearly universal component of current multimodality limb-sparing approaches. As an adjunct to surgery, radiation often allows more conservative resection, with decreased reliance on amputation for the local control of extremity sarcomas. It can be used preoperatively, postoperatively, intraoperatively or as a "sandwich" technique, in which radiation is delivered both before and after surgical resection. All four approaches have been successfully used in selected cases. The rationale for combining radiation with wide or marginal tumor resection is that subclinical disease evident at the margin of the soft tissue sarcomas can be eliminated by a radical course of external beam irradiation treatment.[6] The adjunctive treatment of the periphery of the tumor permits the surgeon to undertake a less radical procedure, thereby avoiding either resection of the entire involved compartment or amputation.

Abbreviations Used

PNET	Primitive neuroectodermal tumor

Preoperative Radiotherapy

Preoperative radiotherapy may decrease the risk of intrapoperative implantation and dissemination of tumor cells with regard to local recurrence and/or distant metastases. Treatment volume can be limited to clinically and radiologically evident tumor and the adjacent tissues at risk for microscopic extension. The reduction of the tumor mass may allow a reduction in the extent of surgery.[7]

The major disadvantages of preoperative radiation therapy include delay of surgical resection and possible compromise of wound healing complicating histological interpretation due to the irradiation of the specimen. Balancing the advantages and disadvantages, the decision should be made on an individual basis. If the tumor is

TABLE 1

Investigators	No. of patients	Mean follow-up (years)	Patterns of failure (%) LF	DM	5-year disease-free Survival (%)	Ultimate limb-salvage rate (%)
Wanebo et al [11]	66	>7	1.5	54	49	91
Levine et al [12]	55	>8	15	36	51	81
Suit et al [13]	89	≈5	10	34	65	NA

LF: Local failure; DM: Distant metastasis; NA: Not available

Table 1: Patterns of failure after preoperative radiotherapy and limb-sparing surgery of soft tissue sarcomas.

TABLE 2

Institutions	No. of patients	Follow-up (years)	Patterns of failure (%) LF	DM	5-year disease-free Survival (%)	Ultimate limb-salvage rate (%)
UCSF [14]	29	>2	4	NA	68	100
MGH [13]	131	>5	15	23	73	NA
MDACC [15]	200	2-7	20	25	69	84.5

Table 2: Patterns of failure after definitive surgery and postoperative radiotherapy of soft tissue sarcomas.

bulky and unresectable and a limb-sparing procedure is still considered feasible, preoperative therapy is clearly indicated.

Eilber et al[8,9,10] popularized preoperative regional chemotherapy and radiation therapy followed by limb salvage surgery in patients with high grade sarcomas. They achieved a high rate of primary limb salvage, low rate of local recurrence (approximately 9%), and survival in 65% of patients. During the earlier phases of this study, the use of large fraction dose (3.5Gy) was associated with increased numbers of both acute and delayed complications, such as bone fractures. Reducing the dose to 1.8Gy improved the complication rate, but was associated with increased local recurrence.

Studies from several other centers have also demonstrated excellent results with preoperative radiotherapy and conservative surgery (Table 1). Wanebo et al[11] used intraarterial infusion with adriamycin 30mg/24 hrs for 3 days and concomitant external beam irradiation, 30-35 Gy in 10 fractions or 46Gy in 23-25 fractions followed by resection. Thirty-one of 66 high-risk patients were offered postoperative chemotherapy with adriamycin 65-70mg/M2 every 3 to 4 weeks until a total dose of 450 mg/M2 was reached. Limb salvage surgery was performed on 60 of 66 patients. Local failure rate was only 1.5% with a median follow up of more than 7 years. No patients died after the operation, but 41% had wound complications. Levine et al [12] at the University of Illinois also achieved good limb-salvage rates. However, the 25% local failure rate in this study for patients who received only the preoperative treatment suggests that 25 Gy (10 fractions) given with concomitant intraarterial adriamycin is inadequate. The major complications of both studies were related to the intraarterial infusion. Suit et al [9] showed a 10% local failure rate at 5 years for preoperative therapy in 89 patients. The dose to the initial target volume used was 50Gy given at 1.8 to 2.0Gy per fraction.

Postoperative radiotherapy

In resectable tumors, the local control rate with combined excision and postoperative radiationtherapy appears comparable to radical surgery, with the risk-benefit ratio favoring combined treatment with preservation of a functional limb.[14,15] Postoperative radiotherapy has been widely used at many institutions as the most common management approach to soft tissue sarcomas of the extremities.

In the largest series, from the M.D.Anderson Cancer Center, [15] 300 patients with soft tissue sarcomas were treated by conservative surgical excisions and postoperative radiotherapy; 200 had tumors in the extremities. (Table 2) The intent of conservative excision was to obtain negative surgical margins. Postoperative radiotherapy was administered to all patients with a dose between 60 and 70Gy. Functional limbs were achieved in 84.5% (169/200) of patients. The incidence of local failure, distant metastasis and survival were influenced by the histopathologic diagnosis and stage (size and grade) of the primary lesion. Major complications occurred in 6.5% of patients, including soft tissue necrosis, traumatic fractures of bone within the radiation field, fibrosis with limitation of motion, nerve and vascular injuries, and moderate edema.

Similar results were reported by Massachusetts General Hospital. [13] Disease-free survival was lower in patients treated by preoperative radiation than postoperative radiation (65% vs. 73%, Table 1), due to the larger proportion of patients with big lesions. This study demonstrated the impact of size of tumor on prognosis, showing a direct proportional relationship between distant metastasis and size.

A small series from the University of California at San Francisco [14] compared the outcome of patients who were treated with combined surgical excision and postoperative irradiation with patients who had undergone excision or radiation therapy only. Of 29 patients who underwent combined treatment, 22 had microscopically positive margins of resection, but only 3 of these 22 patients developed local recurrences. In the 47 nonirradiated patients treated with conservative surgery alone, 14 had positive margins; 11 of these patients developed local recurrences. Five patients were treated with radiation therapy alone. None were controlled.

The merit of preoperative versus postoperative regional therapy remains unclear. To our knowledge, no randomized trial has addressed this issue. From review of retrospective studies, the risk of local recurrence appears not to differ greatly in the two treatment categories.

Brachytherapy

Intraoperative brachytherapy has been used at some institutions as a component of combined modality treatment of soft tissue sarcoma, especially high grade sarcomas. This approach has been highly effective in local tumor control. Harrison et al reported a prospective randomized trial of adjuvant brachytherapy in the management of completely resected soft tissue sarcomas of the extremity and superficial trunk at Memorial Sloan-Kettering Cancer Center:[16] 126 patients were randomized to receive or not receive intraoperative brachytherapy after grossly complete resection with limb-sparing surgery. Iridium-192 implants, delivering 42Gy-45Gy over 4-6 days, were used. At 5 years, local control was 82% in the brachytherapy group vs. 67% in the no- brachytherapy group (p=0.049). When analyzed by histologic grade, it was clear that the local control benefit was limited to high-grade patients (90% vs. 65%, p=0.013). No survival differences were observed between the two groups. Other researchers have reported similar data.[17,18]

Brachytherapy allows the continuous delivery of comparable doses but in a much shorter period of time than external beam irradiation. Theoretically this may offer a radiobiologic advantage[19] - particularly with high grade sarcomas when cell kinetics of tumor growth is considered. The close cooperation between the surgeon and the radiation oncologist in the operating room allows concise mapping of the tumor-bed target while surgical clipping used for conventional external beam therapy cannot be so constricted. Secondly, there are potential cost advantages for the patients. The 6 to 7 weeks of outpatient treatment may not be needed, letting patients return to their normal schedules earlier.

Adjuvant brachytherapy in the management of low-grade soft tissue sarcoma was studied in a prospective randomized trial at Memorial Sloan-Kettering Cancer Center.[20] Forty-five patients with histologic low-grade, completely resected soft tissue sarcomas of the extremity or superficial trunk were randomized to the brachytherapy arm (n=22) or to the no-brachytherapy arm (n=23). The two groups were evenly distributed with respect to the distribution of presentation status, tumor site, tumor size, tumor depth, and microscopic tumor margins. With a median follow-up of 67 months, the addition of adjuvant radiation in the form of brachytherapy did not appear to influence local recurrence rates.

Treatment of soft tissue sarcomas remains a challenge with most patients still succumbing to metastatic disease. Local control of the primary site has been improved by multimodality therapy, either preoperative or postoperative radiotherapy, enabling increasing limb-sparing procedures to be performed.

Chemotherapy

The benefit of intraarterial chemotherapy has been controversial. Two randomized trials, one in soft tissue sarcoma[21] and the other in osteosarcoma,[22] demonstrated no significant differences between regional and systemic perfusion in regard to limb salvage, local recurrence, survival and complications.

Although local control rates are high, the aggressive systemic dissemination of intermediate- and high-grade sarcomas is evident by the fact that disease-free survival rates are consistently below 70%.[11,12,13] The role of adjuvant chemotherapy is problematic and still questioned in spite of occasionally promising studies.[23,24,25] Distant failure is still the major contribution to low survival rate.

Retroperitoneal soft tissue sarcomas

Retroperitoneal soft tissue sarcomas are rare. The symptoms and signs are insidious until late in the course of the disease. This, along with the surgical and radiotherapeutic problems inherent in treating tumors in this location, have resulted in relatively poor outcomes for these patients when compared to those with soft tissue sarcomas of extremities. The role of radiation therapy in the treatment of retroperitoneal sarcomas remains unproven. Retroperitoneal sarcomas are extremely aggressive and have a propensity for local recurrence even following complete surgical resection. Conventional external beam radiation therapy for retroperitoneal tumors is restricted by the surrounding normal tissues. This results in lower total dose and smaller treatment volume than is typically given for limb sarcomas.

Complete resection seems to improve the prognostic outcome of patients with retroperitoneal sarcomas.[26, 27] Published complete resectability rates have averaged about 50% and range from 38-74%.[28] The effect of postoperative radiotherapy on the local tumor control is probably dose-related. Some studies concluded that high-dose postoperative radiation treatment, >55Gy, would improve the the outcome of patients.[23, 26, 29] Cody reported that 5-year survival following complete excision and postoperative radiation therapy was 53%, compared to 30% in patients undergoing excision alone.30 At our institution an attempt has been made to use pre-operative radiotherapy plus brachytherapy for retroperitoneal sarcomas. At the initial exploration the tumor bed is mapped with clips and critical organs are moved out of the field. A tissue expander removes the bowel from this area. A short course

of systemic adriamycin precedes external beam radiotherapy given to a dose of 45 - 50 Gy (1.8 - 2.0Gy per fraction). Two to three weeks later re-exploration is undertaken to remove the tumor. At this time, if the margins are positive, brachytherapy is performed, delivering another 40 Gy in three days.

Pediatric Soft Tissue Sarcoma

Soft tissue sarcomas comprise approximately 10% of tumors in childhood. With these childhood tumors, multidisciplinary management has improved survival, with less deformity and mutilation. Rhabdomyosarcoma accounts for half of these tumors. Non-rhabdomyosarcoma soft tissue sarcomas are infrequent and have almost as many histological patterns as seen in adults. Ewing Sarcoma which can occur in soft tissue as well as bone is a Periodic Acid-Schiff positive staining tumor with characteristic small round blue cells making it closely aligned to the primitive neuroectodermal tumors (PNET) seen in the central nervous system. Soft tissue sarcomas in children are most commonly seen in genitourinary organs and head and neck sites. Only 17% occur in the extremities.

Chemotherapy has contributed significantly to improved control of these tumors. Vincristine, actinomycin-D, adriamycin, and cyclophosphamide in various combinations have been used successfully in early studies. More recently cisplatinum and ifosfamide are being tested. Extirpative surgery for pelvic sites and orbital exenterations are extremely effective for local control; however, over half of these children will die of metastatic disease without adjuvent chemotherapy. In those cases where radiotherapy is used, most sites receive a combination of chemotherapy plus 50 Gy. A recently reported randomized study of hyperfractionated radiotherapy versus single fraction radiotherapy (Intergroup Rhabdomyosarcoma Study) showed equal tolerance for either treatment. Local control and survival data have not yet been reported.[31, 32]

Overall survival is approximately 60% in children with soft tissue sarcomas - with better survival around the orbit and pelvis than in other sites. In children who had surgery and chemotherapy and found to have microscopic residual disease, the addition of radiotherapy produces excellent local control.[31] For patients with Ewing sarcoma, aggressive chemotherapy and surgery may be more effective than radiation and aggressive multi-agent chemotherapy, particularly in sites where surgery is not mutilating. A randomized study is being designed to test this. Brachytherapy is a particularly attractive alternative for lesions of the extremity or in sites where restricted volume of irradiation, important for growth and development, is a consideration. Cooperative Group studies from the Pediatric Oncology Group, The Children's Cancer Group, the Intergroup Rhabdomyosarcoma Studies, and the International Society of Pediatric Oncology have made it possible to study these tumors intensively and formulate therapeutic interventions that have improved treatment in the last two decades.[33]

Quality of Life

Multimodality treatment of soft tissue sarcomas significantly improves patient survival. It has become the treatment of choice for most soft tissue sarcomas of the extremities. The optimal combination of surgery, radiation therapy, and chemotherapy has not been defined. Treatment-related complications can result in deterioration of functional outcome, further diminishing the quality of life benefits of limb-sparing procedures. It is appropriate to focus efforts on producing optimal functional outcome and cosmesis when a primary conservative approach is taken.

Bell et al [34] examined 105 patients who underwent surgical resection and adjuvant irradiation in treatment of soft tissue sarcoma or aggressive fibromatosis. Eighty-eight patients were evaluated 12 months following surgery: 41 patients maintained their full employment and activities. Forty-four patients were re-evaluated at 24 months: there was no difference in their outcome at the two time points. Large tumor size, postoperative complications, and neural sacrifice were associated with poor functional outcome in these patients.

Chang et al. [35] found 17 of 55 patients with extremity sarcomas who underwent multimodality limb-sparing treatment had a significant decline in employment status at 6 and 12 months after initiation of treatment. Performance of daily activities, however, was not significantly impaired at either time. The soft tissue healing complications and joint contractures, which were more predominant in the combined postoperative chemotherapy and radiation group than in the postoperative chemotherapy alone, were associated with reduced functional outcome and quality of life.

Although intuition predicts that the limb-sparing approach should result in improved quality of life over amputation, few studies confirm this. Randomized trial of amputation versus limb preservation at the National Cancer Institute [36] assessed the impact of treatment on behavioral, daily activities, economic status, mobility, pain, sexual adjustment, and treatment trauma. There was no evidence of improved quality of life in patients undergoing limb-sparing surgery and irradiation compared with amputation alone.

Conclusion

Treatment of soft tissue sarcomas remains a challenge. Most patients still succumb to metastatic disease. Local control of the primary site has been improved by multimodal therapy: either preoperative or post-operative radiotherapy has enabled more limb-sparing procedures to be performed. The potential contribution of chemotherapy is under investigation. With children, chemotherapy has established roles which improve outcome of both radiotherapy and surgery; and improved overall survival has been achieved. Coordinated multi-disciplinary management should help more patients successfully manage the tumor, and improve their quality of life.

References

1. Lawrence W, Donegan W, Natarajan N, et al. Adult soft tissue sarcomas: A Pattern of Care Survey of the American College of Surgeons. Ann Surg 1987;205:349-359.
2. Linderberg RD, Martin RG, Romsdahl MM, et al: Conservative surgery and postoperative radiotherapy in 300 adults with soft-tissue sarcomas. *Cancer* 1981;47:2391-2405.

3. Cade SS. Soft tissue tumours: Their natural history and treatment. *Proc R Soc Lond* 1950;44:19.
4. Windeyer SB, Dische S, Mansfield CM. The place of radio-therapy in the management of fibrosarcoma of the soft tissues. *Clin Radiol* 1966;17:32.
5. Tepper JE, Suite HD. Radiation therapy alone for sarcoma of soft tissue. *Cancer* 1985;56:475.
6. Wood WC, Suit HD, Mankin HJ, et al. Irradiation and conservative surgery in the treatment of soft tissue. *Am J Surg* 1984;147: 537-541.
7. Enneking WF, McAudiffe JA. Adjunctive pre-operative radiotherapy in soft tissue sarcoma. *Cancer Treatment Reports* 1985;3:37-42.
8. Eilber FR, Mirra JJ, Grant TT. et al. Is amputation necessary for sarcoma: a 7-year experiment with limb salvage. *Ann Surg* 1980;192: 431-437.
9. Eilber FR, Morton DL, Eckardt J, et al. Limb salvage for skeletal and soft-tissue sarcomas: multidisciplinary preoperative therapy. *Cancer* 1984;53: 2579-2584.
10. Eilber FR, Giuluano A, Huth J. et al. Neoadjuvant chemotherapy radiation, and limited surgery for high grade soft tissue sarcoma of the extremity. In: Ryan JR, Baker LO, eds. *Recent Concepts in Sarcoma Treatment.* Dordrecht, the Netherlands: Kluwer Academic Publishers Groups; 115-122, 1987.
11. Wanebo HJ. Temple WJ, Popp Mb. et al. Preoperative Regional therapy for extremity sarcoma.- A tricenter update. *Cancer* 1995;75:2299-2306.
12. Levine EA, Trippon M, Das Gupta TK. Preoperative multimodality treatment for soft tissue sarcomas. *Cancer* 1993;71:3685-3689.
13. Suit HD, Mankin HJ, Wood WC. et al. Treatment of the patient with stage M0 soft tissue sarcoma. *J Clin Oncol* 1988;6: 854-864.
14. Leibel SA, Tranbaugh RF, Wara WM, et al. Soft tissue sarcomas of the extremities. *Cancer* 1982;50:1076-1083.
15. Lindberg, RD, Martin, RG, Romsdahl, MM, et al. Conservative surgery and postoperative radiotherapy in 300 adults with soft-tissue sarcomas. *Cancer* 1981;47:2391-2397.
16. Harrison LB, Franzese F, Gaynor JJ, et al. Long-term results of a prospective randomized trial of adjuvant brachytherapy in the management of completely resected soft tissue sarcomas of the extremity and superficial trunk. Int *J Radiat Oncol Biol Phys.* 1993;27: 259-265.
17. Habrand JL, Gerbaulet A, Pejovic MH, et al. Twenty year experience of interstitial iridium brachytherapy in the management of soft tissue sarcomas. *Int J Radiat Oncol Biol Phys* 1991;20:405-411.
18. Gemer LS, Trowgridge DR, Neff J, et al. Local recurrence of soft tissue sarcoma following brachytherapy. *Int J Radiat Oncol Biol Phys* 1991;20:587-592.
19. Glicksman AS, Leith JT. Radiobiological considerations of brachytherapy. *Oncology* 1988;2(1):25-30.
20. Pisters PT, Harrison LB, Woodruff JM, et al. A prospective randomized trial of adjuvant brachytherapy in the management of low-grade soft tissue sarcomas of the extremity and superficial trunk. *J Clin Oncol* 1994;12: 1150-1155.
21. Eilber FR, Giuliano JF, Huth JF, et al. Intravenous (IV) vs. intraarterial (IA) adriamycin, 2800r radiation and surgical excision for extremity soft tissue sarcomas: A randomized prospective trial. *Proc Am Soc Clin Oncol* 1990;9: 309.
22. Winkler K, Bielack S, Delling G, et al Effect of intraarterial versus intravenous cisplatin, in addition to systemic doxorubicin, high-dose methotrexate, and ifosfamide, on histologic tumor response in osteosarcoma (study COSS-86). *Cancer* 1990;66:1703-1710.
23. Geer RJ, Woodruff J, Casper ES, et al. Management of small soft-tissue sarcomas of extremity in adults. *Arch Surg* 1992;127:1285-1289.
24. Essner R, Selech M, Eilber FR, et al. Reirradiation for extremity soft-tissue sarcomas: local control and complications. *Cancer* 1991;67: 2813-2817.
25. Antman K, Ryan L, Borden E, et al. Pooled results from three randomized adjuvant studies of doxorubicin versus observation in soft tissue sarcoma: 10-year results and review of the literature. In: Salmon S, editor. *Adjuvant Therapy of Cancer.* Volume VI. Philadelphia: WB Saunders, 529-544, 1990.
26. Van Doorn RC, Galee MW, Hart AM, et al. Resectable retroperitoneal soft tissue sarcomas - The effect of extent of resection and postoperative radiation therapy on local tumor control. *Cancer* 1994;73:637-642.
27. Bevilacqua RG, Rogatko A, Hajdu SI, et al. Prognostic factors in primary retroperitoneal soft tissue sarcomas. *Arch Surg* 1991;126:328-334.
28. Storm FK, Mahvi DM. Diagnosis and management of retroperitoneal soft-tissue sarcoma. *Ann Surg* 1991;214:2-10.
29. Fein DA, Corn BW, Lanciano RM, et al. Management of retroperitoneal sarcomas: does dose escolation impact on locoregional control? *Int J Radiat Oncol Biol Phys* 1995;31:129-134.
30. Cody HS, Turnbull AD, Fortner JG, et al The continuing challenge of retroperitoneal sarcomas. *Cancer* 1981;47:2146-2152.
31. Donaldson S, Breneman J, Asmar L, et al. Hyperfractionated radiation in children with rhabdomyosarcoma - results of an intergrroup rhabdomyosarcoma pilot study. *Int J Radiat Oncol Biol Phys* 1995;32:903-911.
32. Regine WF, Fontanesi J, Kimar P, et al. A phase II trail evaluating selective use of altered radiation dose and fractionation in patients with unresectable rhabdomyosarcoma. *Int J Radiat Oncol Biol Phys* 1995;31:799-805.
33. Marcus RB. Current controversies in pediatric radiation oncology. *Orthopedic Clinics North America.* Nov, 1995.
34. Bell RS, O'Sullivan B, Davis A, et al. Functional outcome in patients treated with surgery and irradiation for soft tissue tumours. *J Surg Oncol* 1991;48:224-231.
35. Chang AE, Steinberg SM, Culnane M, et al. Functional and psychosocial effects of multi-modal limb sparing therapy in patients with soft tissue sarcoma. *J Clin Oncol* 1989;7:1217-1228.
36. Sugarbaker PH, Barofsky I, Rosenberg SA, et al. Quality of life assessment of patients in extremity sarcoma clinical trials. *Surgery* 1982;91:17-23,.

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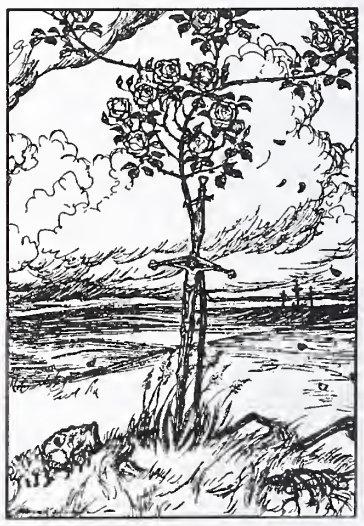

Chemotherapy for Soft Tissue Sarcomas

Jeffrey W. Clark, MD

Adjuvant or Neoadjuvant

Local (Limb perfusion):

Chemotherapy via limb perfusion has been used both alone and in combination with radiation therapy for preoperative treatment of soft tissue sarcomas followed by limb-sparing surgery.[1-3] A number of approaches have been employed, including: 1) chemotherapy (often infusional doxorubicin +/- other agents such as cisplatin or ifsofamide) alone; 2) chemotherapy used sequentially or in a sandwich fashion with radiation therapy; 3) chemotherapy with modulators (such as the combination of melphalan with TNF +/- gamma interferon).[4-6] Although these approaches have produced local recurrence rates of less than 10%, it still has not been established in prospective randomized trials that this is better than the more standard approach of surgery and either pre- or postoperative radiation therapy without chemotherapy.

Systemic:

Despite extensive research, including performance of a number of prospective randomized clinical trials, the use of adjuvant systemic chemotherapy for soft tissue sarcomas remains of unproven benefit in terms of improving survival. The most commonly studied agent has been doxorubicin, either alone or in combination. Although there have been randomized studies indicating a disease-free survival benefit for patients treated with doxorubicin or combined chmotherapy regimens, most studies do not show an overall survival benefit.[7-9] Further research is needed to define new agents with activity against soft tissue sarcomas which might prove beneficial in the adjuvant setting.

Metastatic disease

A number of chemotherapeutic agents, used alone and in combination, have significant activity against metastatic soft tissue sarcomas.[10] Doxorubicin and ifsofamide are the most active agents clearly identified to date, with dacarbazine, dactinomydin, cisplain, cyclophosphamide and methotrexate also having moderate activity. Combination regimens, usually including doxorubicin and ifsofamide +/- dacabarbazine, have been tried with response rates ranging from 30 to 60%. Infusional doxorubicin decreases the cardiotoxicity as compared to its use by bolus.[11] Although the response rates may be higher with combination regimens, there is not a clear survival advantage over the use of single agents sequentially, with single agent doxorubicin remaining the standard single chemotherapeutic agent of choice.[12] Since there is greater toxicity, especially in terms of bone marrow suppression and neuropenia, with combination therapy, this has to be weighed in considering whether combined chemotherapy or the sequential use of single agent therapy is the best treatment for individual patients outside of a clinical study setting.[13] Consideration of bone marrow reserve, age, and comorbid factors all are important in making such a decision.

Evidence suggests an increased response rate for soft tissue sarcomas when doxorubicin and ifsofamide are given at higher doses.[14-16] Therefore, regimens using these agents at increased dose intensity with hematological growth factors (G-CSF or GM-CSF) +/- bone marrow or peripheral blood stem cell rescue have been evaluated for their activity both for metastatic disease and in the adjuvant settting. There has been no clear cut survival benefit for such approaches to date.[17,18] However, a number of ongoing trials are investigating whether improvements in such approaches will enhance survival.

New agents and approaches are being evaluated both clinically and in preclinical studies. Of new chemotherapeutic agents evaluated in phase II trials, the taxane docetaxel has shown promise; and further evaluation is ongoing to determine whether it should be included as part of regimens for first line therapy.[19,20] Other experimental approaches being evaluated include: 1) Biological response modifiers, such as TNF, alpha interferon, gamma interferon, or IL-2. These have not been shown to have significant activity when used alone. However, as discussed above, there may be benefit for TNF +/- gamma interferon used in combination with chemotherapy for limb salvage, although further study is needed to better define what role TNF (or gamma interferon) has in these effects.[4-6]. 2) Modulators of multiple drug resistance which have not yet been established to produce clinical benefit but which continue to be investigated;[21,22] 3) Combinations of chemotherapy and hyperthermia which have been shown to be feasible in a number of Phase III studies, although their clinical advantage still must be established;[23] and 4) Immunotoxins targeted specifically to soft tissue sarcomas.[24] Hopefully, improved understanding of the biology of soft tissue sarcomas, as well as the development of new approaches and discovery of new agents, will enhance the ability to cure patients with this disease.

Abbreviations Used

TNF	Tumor necrosis factor

References

1. Eilbert FR, Eckardt JJ. Rosen O. et al. Neoadjuvant chemotherapy and radio-

therapy in the multidisciplinary management of soft tissue sarcomas of the extremity. *Surg Oncol Clin North Am* 1993;2:6110620.
2. Pollock RI. Limb-sparing therapy for soft tissue sarcomas. *Curr Opin Gen Surg* 1994; 224-229.
3. Wanebo HJ, Temple WJ, Popp MB, et al. Preoperative regional therapy for extremity sarcoma. A tricenter update. *Cancer* 1995;75:2299-306.
4. Lienard D, Ewalenko P, Delmotte JJ, et al. High-dose reombinant tumor necrosis factor alpha in combination with interferon gamma and melphalan in siation perfusion of the limbs for malanoma and sarcoma. *J Clin Oncol* 1992;10:2.
5. Eggermont AM, Lienard D, Schraffordt Kopps H, et al. Limb salvage by high dose tumor necrosis factor alpha (TNF), gamma interferon (IFN) and melphalan isolated limb perfusion (ILP) in patients with irresectable soft tissue sarcomas. *Proc Am Soc Clin Oncol* 1992;11:412.
6. Inbar M, Abu Abid S, Lev D, et al. r-Tumor necrosis factor alpha with melphalan administration via isolated limb perfusion (ILP) for extensive soft tissue sarcoma. *Proc Am Soc Clin Oncol* 1994;13:481.
7. Antman KH. Chemotherapy of advanced sarcomas of bone and soft tissue. *Semin Oncol* 1992;19(6 suppl 12):13-20.
8. Zalupski MM, Baker LH. Systemic adjuvant chemotherapy for soft tissue sarcomas. *Hematology-Oncology Clin of N Amer* 1995;9:787-800.
9. Bramwell V, Rouesse J, Steward W, et al. Adjuvant CYVADIC chemotherapy for adult soft tissue sarcomas. Reduced local recurrence byt no improvement in survival: A study of the European Organization for Research and Treatment of Cancer Soft Tissue and Bone Sarcoma Group. *J Clin Oncol* 1994;12:1137-1149.
10. Demetri GH, Elias AD. Results of single agent and combination chemotherapy for advanced soft tissue sarcomas. Implications for decision making in the clinic. *Hematology Oncology Clin of N Amer* 1995;9:765-785.
11. Zalupski M, Metch B, Balcerzak S, et al. Phase III comparison of doxorubicin and dacarbazine given by bolus versus infusion in patients with soft-tissue sarcomas: A Southwest Oncology Group Study. *J Nat Cancer Inst* 1991;83: 926-932.
12. Santoro A, Tursz T, Mouridsen H, et al. Doxorubicin versus CYVADIC versus doxorubicin plus ifsofamide in first line treatment of advanced soft tissue sarcomas: A randomized study of the European Organization for Research and Treatment of Cancer Soft Tissue and Bone Sarcoma Group. *J Clin Oncol* 1995;13:1537-1545.
13. Budd GT. Palliative chemotherapy to adult soft tissue sarcomas. *Semin Oncol* 1995;22(2 Supple 3):30-34.
14. Borden E, Amato D, Rosenbaum H. et al. Randomized comparison of three Adriamycin regiments for soft tissue sarcomas. *J Clin Oncol* 1987;5:840-855.
15. Liem GS, Verweij J. The use of hematological growth factors to enable dose intensification in chemotherapy for soft tissue sarcomas. *Stem Cells* 1994;12:402-408.
16. Le Cesne A, Antoine E, Spielmann M, et al. High-dose ifsofamide: Circumvention of resistance to standard dose ifsofamide in advanced soft tissue sarcomas. *J Clin Oncol* 1995;13:1600-1608.
17. Brunat-Mentigny M, Rivoire J, Philip I, et al. High-dose chemotherapy (VIC) and bone marrow support in advanced sarcomas. *Proc Am Soc Clin Oncol* 1994;13:479 (Abstr 1672).
18. Kessinger A, Petersen K, Bishop M, et al. High dose therapy (HDT) with autologous hematopoietic stem cell rescue (HSCR) for patients with metastatic soft tissue sarcomas. *Proc Am Soc Clin Oncol* 13:480 (Abstr 1674).
19. Cortes JE, Pazdur R. Docetaxel. *J Clin Oncol* 1995;13:2643-2655.
20. Verweij J, Catimel G, Sulkes A, et al. Phase II studies of doxetaxel in the treatment of various solid tumours. EORTC Early Clinical Trials Group and the EORTC Soft Tissue and Bone Sarcoma Group. *Eur J Cancer* 1995;31A (Supple 5):S21-24.
21. Stein U, Wunderlich V, Haensch W. et al. Expression of the mdr1 gene in bone and soft tissue sarcomas of adult patients. *Eur J Cancer* 1993;29A: 1979-1981.
22. Chan HS, DeBoer G, Haddad G,et al. Multidrug drug resistance in pediatric sarcoma. *Hematology Oncology Clin of N Amer* 1995;9:889-908.
23. Hoekstra HJ, van Ginkel RJ, Nieweg OE, et al. Evaluation of tumor metabolism and response to hyperintermic isolated regional perfusion (HIRP) with TNF-a, IFN-a and melphalan for soft tissue sarcoma with FDG Position Emission Tomography (PET). *Proc Am Soc Clin Oncol* 1994;13: 474 (Abstr 1651). 24. Anderson PM, Meyers DE, Hasz DB. et al. In vitro and in vivo cytoxicity of an anti-osteosarcoma immunotoxin containing pokeweed antiviral protein. *Cancer Res* 1995;55:1321-1327.

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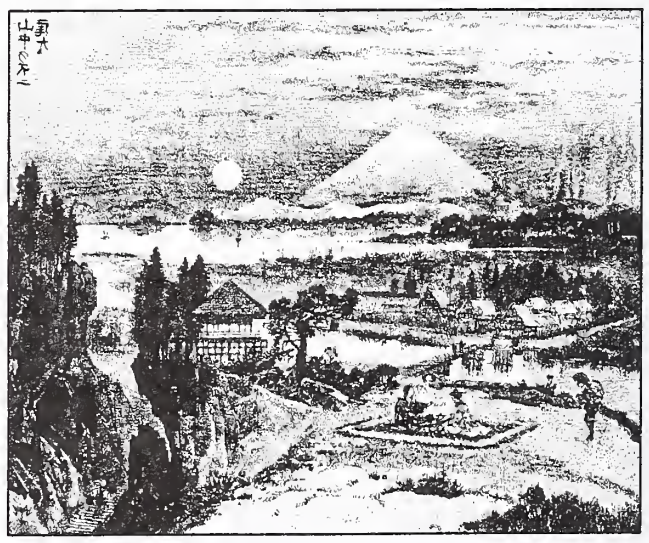

Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Health Risks Among Low-Income Rhode Island Adults

Jana E. Hesser, PhD, and Robert M. Cabral, PhD

Health disparities between Americans of low income and those with higher incomes are almost universal for all dimensions of health.[1] Americans with low income experience above-average incidence of premature death, disease, and disability due to chronic and infectious diseases and traumatic injuries. Just as poor health is more likely among persons of low income, so is exposure to risk from personal behaviors and lifestyles now recognized as major determinants of health status. These risk factors include: obesity, poor diet, tobacco use, and lack of exercise. Likewise, low-income persons are less likely to have health insurance coverage, and are less likely to be screened for early diagnosis and treatment of diseases.[1]

The Rhode Island Department of Health, through its Behavioral Risk Factor Surveillance System (BRFSS), has surveyed a sample of Rhode Island adults by telephone each year since 1984 to track rates in Rhode Island's population for key health risk behaviors, health insurance coverage, and participation in health screening. Funded by the Centers for Disease Control and Prevention (CDC), Rhode Island's BRFSS, along with those of the other 49 states, Washington DC, and 3 territories, is part of a national effort to monitor trends for these risk factors.[2]

Each month, the BRFSS conducts telephone interviews with approximately 150 randomly selected Rhode Island residents aged 18 and older living in households with telephones. In 1995, 1,776 interviews were completed by a professional survey research organization under contract to the Department of Health. Methods used for the BRFSS are defined by CDC[3] and followed by all states participating in the BRFSS. Results for prior year surveys and for 1995 have been reported elsewhere.[3,4,5]

This report contains statistics from the 1995 BRFSS on 15 major health risks, comparing rates for low-income Rhode Island adults with those for middle- and high-income Rhode Islanders (Table 1, Figure 1). Low-income households were defined as those with a total income below 185%

TABLE I

LOW-INCOME RHODE ISLANDERS HAVE HIGHER RATES FOR:	MIDDLE AND HIGH-INCOME RHODE ISLANDERS HAVE HIGHER RATES FOR:
• Current smoking	• Binge drinking
• Being overweight	• Chronic drinking
• Having been told by a doctor they have diabetes	• Driving under the influence of alcohol
• Being uninsured	
• No flu immunization (65+)	
• Non-participation in screening for:	
- cholesterol levels	
- oral/dental checkups	
- digital rectal exam	
- mammograms (women)	
- pap smears (women)	

Risk factors are defined as follows:
Binge Drinking: Five or more drinks on an occasion during past month.
Chronic Drinking: Averaged 2+ drinks/day in past month.
Driving Under the Influence: Drove after having too much to drink during past month.
Current Smoker: Ever smoked 100 cigarettes and smokes regularly now.
Overweight: Body-mass index ≥ 27.3 for females, ≥ 27.8 for males.
Diabetes: Ever told by MD has diabetes
Uninsured: Has no health insurance
Flu Immunization: No flu shot in past 12 months, age 65+
Cholesterol: Never had blood cholesterol checked
Hypertension: Blood pressure not checked in past 2 years
Oral/Dental Checkup: No oral/dental checkup in past 12 months
Rectal Exam: Never had a digital rectal exam, age 40+
Mammogram: No mammogram in past 2 years — women, age 40+
Pap Smear: No Pap test in past 2 years — women
Safety Belt: Sometimes, seldom, or never uses safety belts.

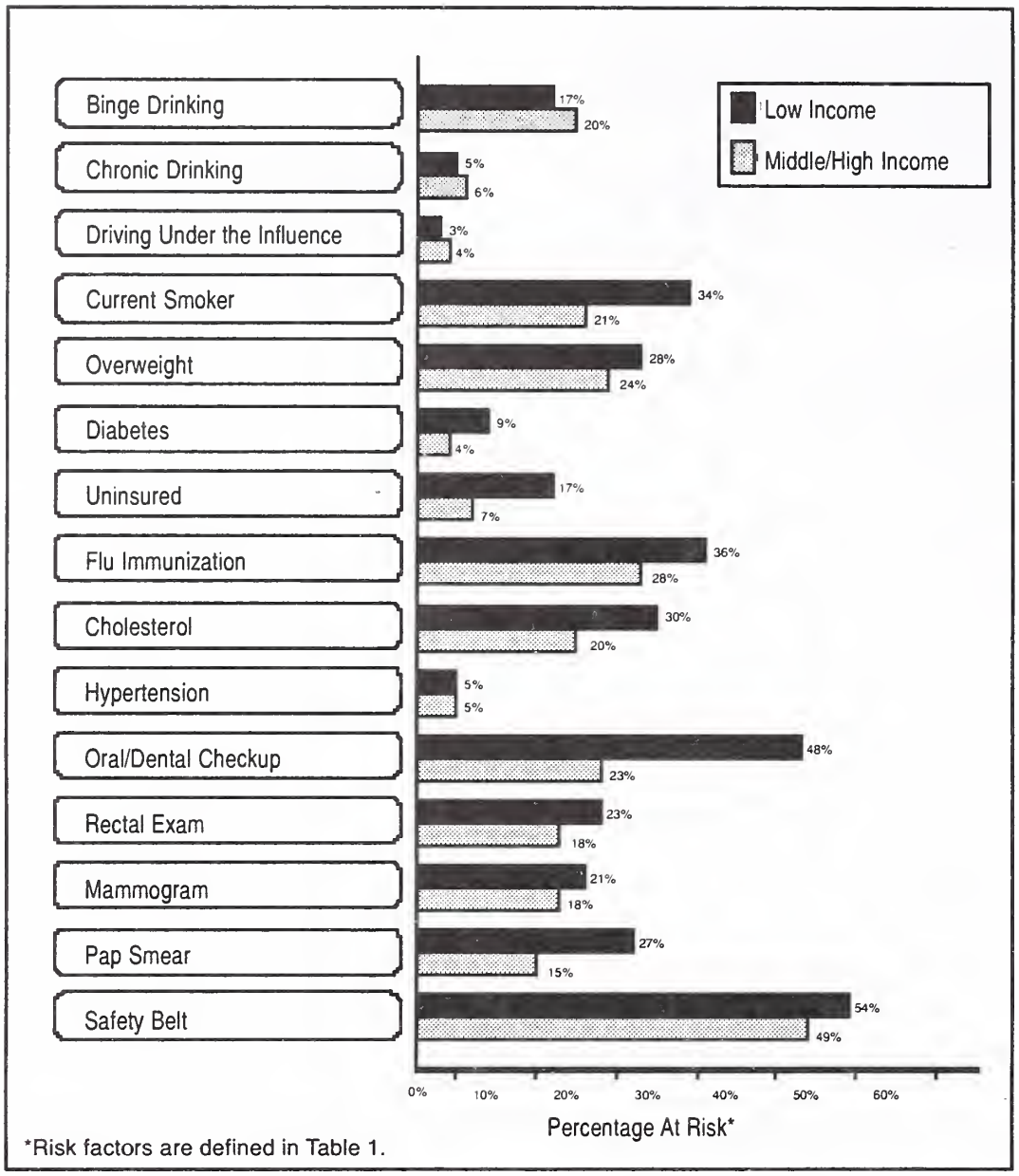

Figure 1. Health Risks Among Adult Rhode Islanders by Income Level, 1995

person household with an annual household income of $19,166 is at 185% of the poverty level; a three-person household with an annual household income of $24,013 is at 185% of the poverty level. This threshold is frequently used for government health and social programs.

Results of the 1995 BRFSS indicate that low-income adults are more at risk than middle- and high-income adults for 11 of the risk factors, while middle- and high-income Rhode Islanders are more at risk only for alcohol-related risk factors. Rates for non-participation in blood pressure checks were very low (5%) in both income groups.

Currently, efforts are being made in the state to address some of these disparities. The RIte Care Program is designed to make health insurance available to more persons with low incomes, and to provide a "medical home" for Medicaid-eligible women and children. Each RIte Care participant is assigned to a primary care provider who manages that individual's health care needs.

Other efforts are being made to increase the availability of free screening opportunities to low income persons, such as through the Women's Cancer Screening Program. This program offers uninsured and underinsured women screening, follow-up diagnostic tests, and referral to treatment programs if medically indicated.

Efforts to increase access to preventive and primary care in the state especially target lower income groups. For example, the Diabetes Prevention and Control Program offers screening services through the community health centers; a special component of the program targets lower-income Hispanic populations by providing education and referrals in Spanish.

Results from future Behavioral Risk Factor Surveillance System surveys will help evaluate whether these efforts are achieving health equity for all Rhode Islanders.

References

1. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington, DC: US Department of Health and Human Services, 1990. (DHHS Pub. No. (PHS) 91-50212).
2. Frasier EL, Franks AL, Sanderson LM, "Behavioral Risk Factor Data" In: Centers for Disease Control and Prevention. *Using Chronic Disease Data: Aa Handbook for Public Health Practitioners.* Atlanta, 1992.
3. Office of Health Statistics. *Health Risk Behaviors Among Rhode Island Adults, 1990-1994.* Providence, RI: Rhode Island Department of Health, 1996.
4. "Trends and Patterns in Health Risk Behaviors." [Health by Numbers] *Rhode Island Medicine* 1994:77(1):26-27.
5. Office of Health Statistics. "Health Risks of Adult Rhode Islanders in 1995." Providence, RI: Rhode Island Department of Health, 1996.

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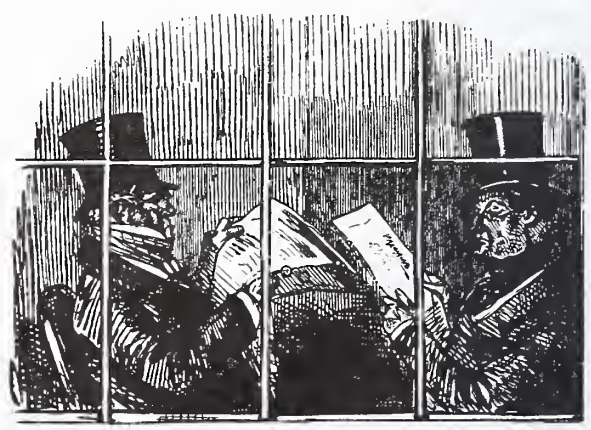

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Proposed Cervical Cancer Screening Recommendations

Marguerite Vigliani, MD, and Joann Lindenmayer, DVM, MPH

Objective

The Rhode Island Department of Health assembled an Expert Panel on Cancer Screening to advise the Department on revising the State's current cancer control plan, published in 1989.[1] After reviewing the current screening recommendations of national organizations and the most recent pertinent literature, the Panel proposed a recommendation for cervical cancer screening.

Methods

- Review current cervical cancer screening recommendations of national organizations.
- Review the most recent literature pertinent to cervical cancer screening.
- Discuss.
- Propose a cervical cancer screening recommendation for the State's cancer control plan.
- Write a simple rationale for the proposed cervical cancer screening recommendation.
- Invite comments on the proposed recommendation and rationale.

Current Recommendations

Organization	Recommendations
U.S. Preventive Services Task Force[2]	• Routine screening for cervical cancer with Pap testing is recommended for all women who are or have been sexually active and who have a cervix. • Pap smears should begin with the onset of sexual activity and should be repeated at least every 3 years. • There is insufficient evidence to recommend for or against an upper age limit for Pap testing, but recommendations can be made on other grounds to discontinue regular testing after age 65 in women who have had regular previous screenings in which the smears have been consistently normal.
American College of Gynecologists	• Pap smears should begin for all women by age 18 and for sexually active women regardless of age. High risk patients should be screened annually. For low risk patients, after two successive negative annual smears, the interval of screening is arbitrary and should be based on the informed decision of the patient and physician. • For DES-exposed patients, screening should begin at menarche, at age 14, or at the onset of symptoms. Pap smears should be done at 6 to 12 month intervals. • For women who have had a hysterectomy, vaginal smears should be done at 3 to 5 year intervals.

Current Recommendations *(continued)*

Organization	Recommendations
American College of Gynecologists (continued)	• Following therapy for preinvasive disease of the cervix, women should be screened at 4 to 6 month intervals for 2 years and annually thereafter. • Following therapy for invasive cervical cancer, women should be screened at 3 month intervals for 2 years and every 6 months thereafter.
Canadian Task Force on the Periodic Health Examination	• Annual Pap smears in women should begin following initiation of sexual activity or age 18. After two normal smears, screening may be performed every 3 years until age 69. • For women who are at elevated risk for cervical cancer, more frequent screening should be considered.
American Cancer Society, National Cancer Institute, American College of Obstetricians and Gynecologists (ACOG), American Medical Association, American Academy of Family Physicians (AAFP): Consensus statement	• All women who are or have been sexually active, or who have reached age 18, should have annual Pap smears. • After three or more annual smears have been normal, screening may be performed less frequently, at the discretion of the physician. • There is no recommendation regarding the age at which Pap testing may be discontinued.

Proposed Rhode Island Recommendations

- For women in high risk groups - women with multiple sex partners, sexually promiscuous partners, early age at first intercourse, and/or a history of a sexually transmitted disease (including human papilloma virus), Pap smears should be performed annually.
- For women who are HIV positive, Pap smears should be performed at least annually.
- Asymptomatic low risk women with a cervix and who are or have been sexually active should have regular Pap smears. After three consecutive negative annual smears, routine Pap smears should be performed no less frequently than every three years. There is no upper age limit for the performance of routine Pap smears.
- If a history of past and/or present sexual activity cannot be accurately determined and a woman is 18 years of age or over, routine Pap screening should be initiated.
- Women who have had a hysterectomy cannot be presumed to be without cervical tissue and the decision to screen them with Pap smears should be determined on a case by case basis.

Rationale

When the Rhode Island Cancer Control Plan for 1990-1992 was published, the Director of Health determined that women younger than 18 who had been sexually active and all women 18 years of age and over should be screened by cervical cytology (Pap smear) every one to three years.

Since the Rhode Island Cancer Control Plan for 1990-1992 was published, additional information on appropriate screening intervals, as well as information on groups at particularly high risk for development of cervical cancer, has become available. The basic recommendations for cervical cancer screening remain the same. *Within* the recommended range of one to three year screening intervals, however, longer intervals could be considered for asymptomatic women with no risk factors, and shorter intervals should be considered for women in high risk categories. Findings from the recent literature relevant to the proposed recommendations include the following:

- The dramatic declines in incidence and mortality rates from invasive cervical cancer over the past forty years have been largely attributed to widespread use of the Pap test. Use of the Bethesda system for classification of cervical diagnoses is likely to further increase the accuracy of the Pap test as a screening test for cervical cancer.
- Asymptomatic women with certain risk factors—

multiple sex partners, sexually promiscuous partners, early age at first intercourse, and women with a history of a sexually transmitted disease, are at 2-4 times increased risk for development of cervical cancer compared to women without such risk factors.[3]

- Women who are infected with HIV require more frequent screening according to established guidelines. [4]
- Widespread performance of supracervical hysterectomies in the past, combined with renewed interest in this procedure, means that some women with a history of having had a hysterectomy may retain all or part of a cervix. Screening for cervical cancer in these women may be justified even though the source of cells may be vaginal rather than cervical.
- Infection with human papilloma virus (HPV), a sexually transmitted pathogen, is widespread, particularly among young women. Infection with certain types of HPV is strongly associated with the development of cervical cancer. Although women who have never been sexually active may be at decreased risk for the development of cervical cancer, it may be extremely difficult to determine whether or not a patient (particularly a young one) is or has been sexually active. Under these circumstances, it is prudent to assume, as do a number of professional organizations, that sexual intercourse has occurred by the age of eighteen, and to begin cervical cancer screening at this time.
- Although the effectiveness of cervical cancer screening increases when Pap testing is performed more frequently, screening intervals of between 1-3 years have been shown to be almost equally effective in reducing a woman's risk of developing invasive cervical cancer. [5]
- For older women who have received routine, serial, negative Pap smears during their lifetimes, routine screening after the age of 65 may offer no additional benefit. However, many older women, particularly women of low income or members of minority groups, have been incompletely screened or not screened at all. For these women, screening at or beyond age 65 is mandatory and should be continued until multiple, serial, negative Pap smears are obtained.

Comments?

We invite your comments on the proposed recommendation and rationale.

Please send them in writing to Dr. Joann Lindenmayer, either by fax (401-861-5751) or by mail (Rhode Island Department of Health, 3 Capitol Hill, Providence, RI 02908-5097).

References

1. Rhode Island Department of Health. *Cancer Control Rhode Island. Plan for 1990-1992.* Providence, RI: Rhode Island Department of Health, 1989.
2. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services, 2nd ed.* Baltimore: Williams and Wilkins, 1996.
3. Brownson RC, Reif JS, Alavanja MCR, and Bal DG. Chronic Disease Epidemiology and Control. Washington, D.C.: American Public Health Association; 1993.
4. El-Sadr W, Oleske JM, Agins BD, et al. Evaluation and management of early HIV infection. Clinical practice guideline no. 7. Rockville, MD: Agency for Health Care Policy and Research, 1994:60-65. (AHCPR Publication No. 94-1572).
5. International Agency for Research on Cancer Working Group on Evaluation of Cervical Cancer Screening Programmes. Screening for squamous cervical cancer: duration of low risk after negative results of cervical cytology and its implication for screening policies. *BMJ* 1986;293:659-664.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	July 1996	12 Months Ending with July 1996	
	Number	Number	Rates
Live Births	1,112	13,809	14.0*
Deaths	724	9,554	9.7*
Infant Deaths	(8)	(98)	7.1#
Neonatal deaths	(5)	(74)	5.4#
Marriages	733	7,891	8.0*
Divorces	195	3,310	3.3*
Induced Terminations	402	5,508	398.9#
Spontaneous Fetal Deaths	48	1,049	76.0#
Under 20 weeks gestation	(42)	(1,000)	72.4#
20+ weeks gestation	(6)	(49)	3.5#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	January 1996	12 Months Ending with January 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	291	3,304	333.8	4,113.5
Malignant Neoplasms	198	2,538	256.4	6,631.0
Cerebrovascular Diseases	55	652	65.9	535.0
Injuries (Accident/Suicide/Homicide)	22	332	33.5	6,248.0
COPD	32	403	40.7	390.0

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

The Invention of the Stethoscope

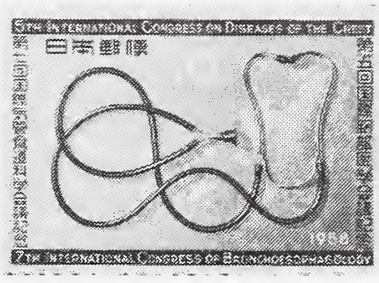
Rene Theophile Hyacynthe Laënnec [1781-1826], the son of a village lawyer, was born in the lower Brittany town of Quimper on February 17, 1781. His mother died of tuberculosis. At age 8, he was adopted by his paternal uncle, then chief physician at the Hotel Dieu hospital.

Young Laennec apprenticed in medicine under his uncle. The 14 year-old worked as a surgeon's aide during the conflicts surrounding the French Revolution [France, 1952, #685]. In 1801, at age 20, Laennec commenced his formal medical studies at Charité Hospital in Paris, studying under such clinical masters as Corvisart, Bichet, Dupuytren and Bayle. His primary interest was pathological anatomy. His clinical skills, however, were judged by his professors to be outstanding; and he was selected as the best student in his class. In 1804 he was awarded a doctorate - his thesis was entitled, "Proposition sur la Doctrine d'Hippocrate Relativement a la Medicine Pratique."

Prompted by financial constraints, Laennec abandoned his research and began the practice of medicine, developing in a short time an outstanding reputation as a skilled clinician. In 1816 Laennec was chosen as chief physician of the Necker Hospital. He was allowed to continue his clinical research at this site, and here he first described the instrumentation which he had devised for indirect auscultation of the thorax.

He wrote, "When I was treating a girl who was suffering from some cardiac disease, I couldn't make a diagnosis from palpation or the percussion method because she was overweight. I hesitated to put my ear directly on her chest because she was a young girl. I remembered the auditory phenomenon in which a scratching at one end of a stick can clearly be heard at the other end. I made a cylindrical tube from a piece of paper. One end of the tube was placed upon the chest and I put my ear to the other end, making it possible for me to hear her heart beat."

While direct auscultation had been known since classical Grecian days, Laennec's contribution consisted of devising a means of indirect [mediate] auscultation. After much experimentation, he produced a tubular wooden structure with flanges and an inner bore of a specified diameter. His various experiments and the various diagnostic uses of this instrument were described in his famous text, *Auscultation Mediate*, published in 1819. [Japan, 1958, #655].



In honor of his invention of the stethoscope, a commemorative plaque graces the main entrance of the Necker Hospital. This tablet states: "Laennec invented the auscultation method at this hospital." He was additionally honored by having another hospital in Paris bear his name.

Because of the reactivation of his pulmonary tuberculosis, Laennec was forced to give up his medical practice and return to the town of his birth, Quimper. By 1822 he had recovered sufficiently to return to Paris, where he accepted the appointment of professor of medicine at Charité Hospital and College de France.

In 1824 he was elected to the prestigious Medical Academy. His clinical practice was devoted principally to patients with pulmonary tuberculosis. Much of his time, though, was also invested in the education of medical students. In 1824 he married and in 1826 he published the second, and revised, edition of his great text on diseases of the thorax. His health again deteriorated, and again he retreated to his Brittany village to recuperate. After repeated pulmonic hemorrhages, however, he died of tuberculosis on August 13, 1826, at the tragically young age of 45.

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Ninety Years Ago

[November, 1906]

The lead editorial expresses deep concern regarding the spread of hydrophobia in the City of Providence. "During the past few months 30 to 40 persons living in or near the City of Providence have been bitten by dogs or cats which have subsequently been proven to have rabies. Many of these patients were sent to the Pasteur Institute in New York for treatment." So many cases have arisen, the editorial notes, that a local site for the Pasteur therapy has now been established at Rhode Island Hospital. The editorial then urges the members to familiarize themselves with the facts surrounding rabies and its therapy. The editorial concludes by citing the case of a local physician who recently treated a dog bite, telling the patient that no further treatment was needed. A few days later, the dog's body was exhumed and histological examination of the brain showed evidence of rabies.

The other major editorial summarizes various reports on the urgent need to provide clean milk for babies. A group of local physicians met on May 25 to consider a plan for the furnishing of clean milk for infants during the coming hot weather. A plan evolved [chaired by Dr. C.V.Chapin] to establish a number of milk stations, to collect money, hire nurses and helpers, purchase bottles, scales, refrigerators and abundant ice. The milk, obtained from a Seekonk farm, was neither pasteurized nor sterilized, but was promptly cooled and periodically checked for bacterial content. [The count never rose above 200,000 bacteria per cc.] A different mixture of milk, water, lime water and milk sugar was then used, depending upon the age of the infant. It was the conclusion of the medical committee that these milk stations saved lives. During the course of one summer, only 4 of the 143 infants attending the milk delivery unit died.

Edmund D. Cheesebro, MD, discusses the present status of substitute milk feeding of infants, reviewing first the history of artificial feeding for human infants. The author notes that milk from nearly all mammals may be used as food for infants, but that cow's milk, appropriately admixed with water and lactose, comes closer to the composition of human breast-milk. He notes, because of "the advancing strides of civilization," that substitute feeding will necessarily replace breast feeding but that "An exact substitute for human milk is no more likely to be found than is the Philosopher's Stone." A satisfactory substitute must at least approximate human milk. He concludes: "The frightful mortality among infants fed artificially should be a most powerful incentive for the practitioner to familiarize himself with the most approved practical teaching on the subject of infant feeding."

Fifty Years Ago

[December, 1946]

Joseph N. Corsello, MD, and William B. O'Brien, MD, discuss primary bronchogenic carcinoma, reporting on 47 cases derived from the records of the Rhode Island State Sanatorium, Wallum Lake. The majority were males between ages 40 and 69 years. The authors believe that "many patients with primary bronchogenic carcinoma are already beyond the curable stage by the time the initial symptoms appear." A detailed description of presenting signs and symptoms, radiologic findings, and the merit of various forms of therapy then follows, but there is no mention of the extent to which any of these patients were cigarette smokers.

Some of the late clinical manifestations of military campaign-acquired tropical diseases are described by Marshall N. Fulton, MD. He details the clinical course of an army veteran who had served in Italy. Only after a sternal marrow biopsy had been undertaken was the diagnosis of leishmaniasis [kala azar] established. The recognition and treatment of amebiasis, schistosomiasis [japonicum] and systemic filariasis are then carefully discussed including the need to obtain a travel history from all potential victims of these infections, and second, to employ where possible, newer complement fixation test and skin tests as diagnostic aids.

Frtiz Behrendt, MD, and Alex M. Burgess, MD, describe the rice diet in the treatmernt of hypertension, noting that 7 of 9 patients so treated showed a substantial drop of blood pressure after one week on the Kempner diet and the BUN dropped in two of the patients.

The lead editorial discusses the pros and cons of mass influenza vaccination.

Twenty Five Years Ago

[December, 1971]

The role of volunteer health agencies, particularly their educational activities, is discussed by Ralph C. Kuhli, MPH.

Charles E. Millard, MD, discusses the delivery of ambulatory care within the context of the nation's numerous health care problems. He cites, first, the many emerging problems including the burdens imposed by chronic, debilitating disease and the substantial numbers of people earning inadequate wages. To attract physicians to locate in economically deprived regions, the author suggests an innovative tax incentive program. The author then discusses the respective roles of the public and private sectors. He concludes by quoting the leader of the AFL-CIO, when discussing wage and price freezes: "labor and management participation would have to be voluntary because Government compulsion would put the nation on the road to fascism." It is incongruous," says the author, "then for labor leaders to advocate compulsory national health insurance - for, if the foot of Labor puts the Nation on the road to Fascism, I assure you, the shoe placed on the foot of Medicine leads down the same path."

Charles L. Hill, MD, describes an innovative and relatively inexpensive new treatment facility, called the surgicenter, to answer the problems of limited numbers of hospital beds.

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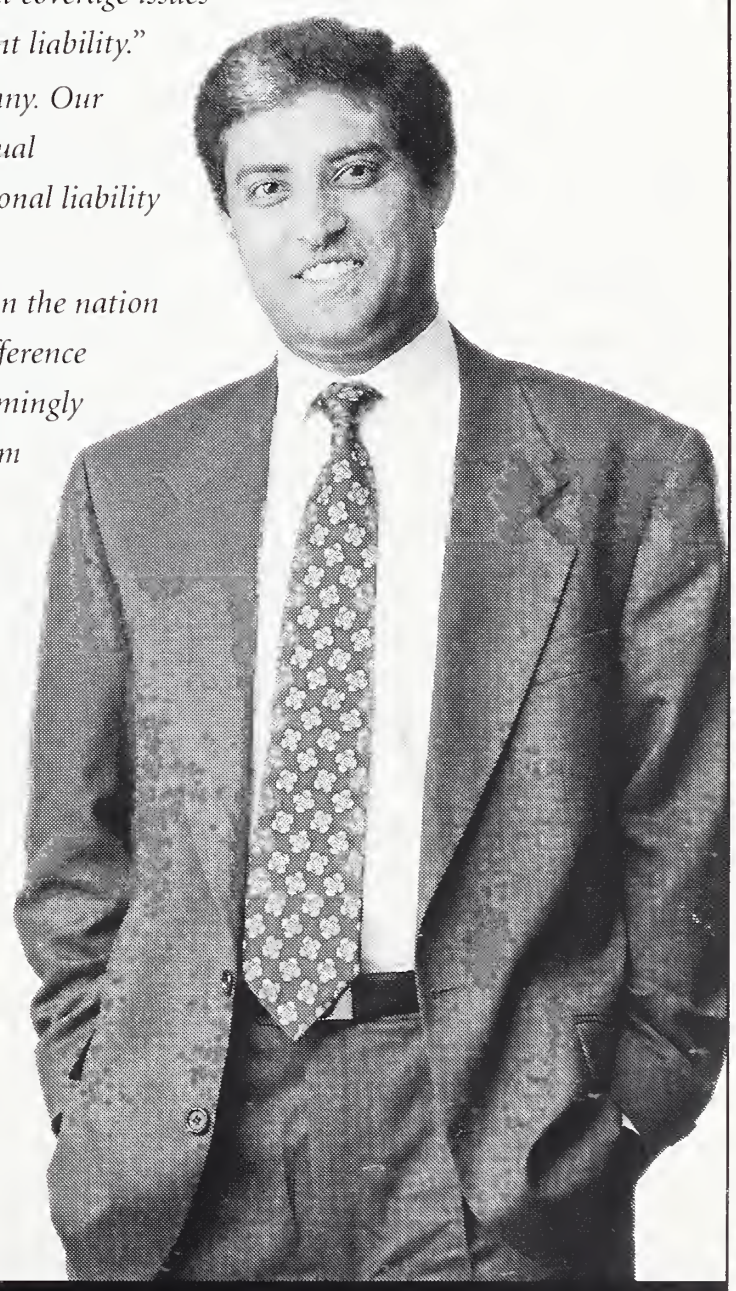

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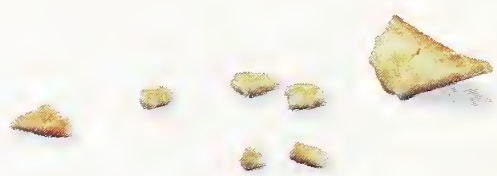

Medicine AND Health
RHODE ISLAND

Vol. 80 No. 2 February 1997

Natural and *Political*

OBSERVATIONS

Mentioned in a following Index,

and made upon the

Bills of Mortality.

By *JOHN GRAUNT*,

Citizen of

LONDON.

With reference to the *Government*, *Religion*, *Trade*, *Growth*, *Ayre*, *Diseases*, and the several Changes of the said City.

—— *Non, me ut miretur Turba, laboro,*
Contentus paucis Lectoribus ——

LONDON,

Printed by *Tho: Roycroft*, for *John Martin*, *James Allestry*, and *Tho: Dicas*, at the Sign of the *Bell* in St. *Paul's* Church-yard, MDCLXII.

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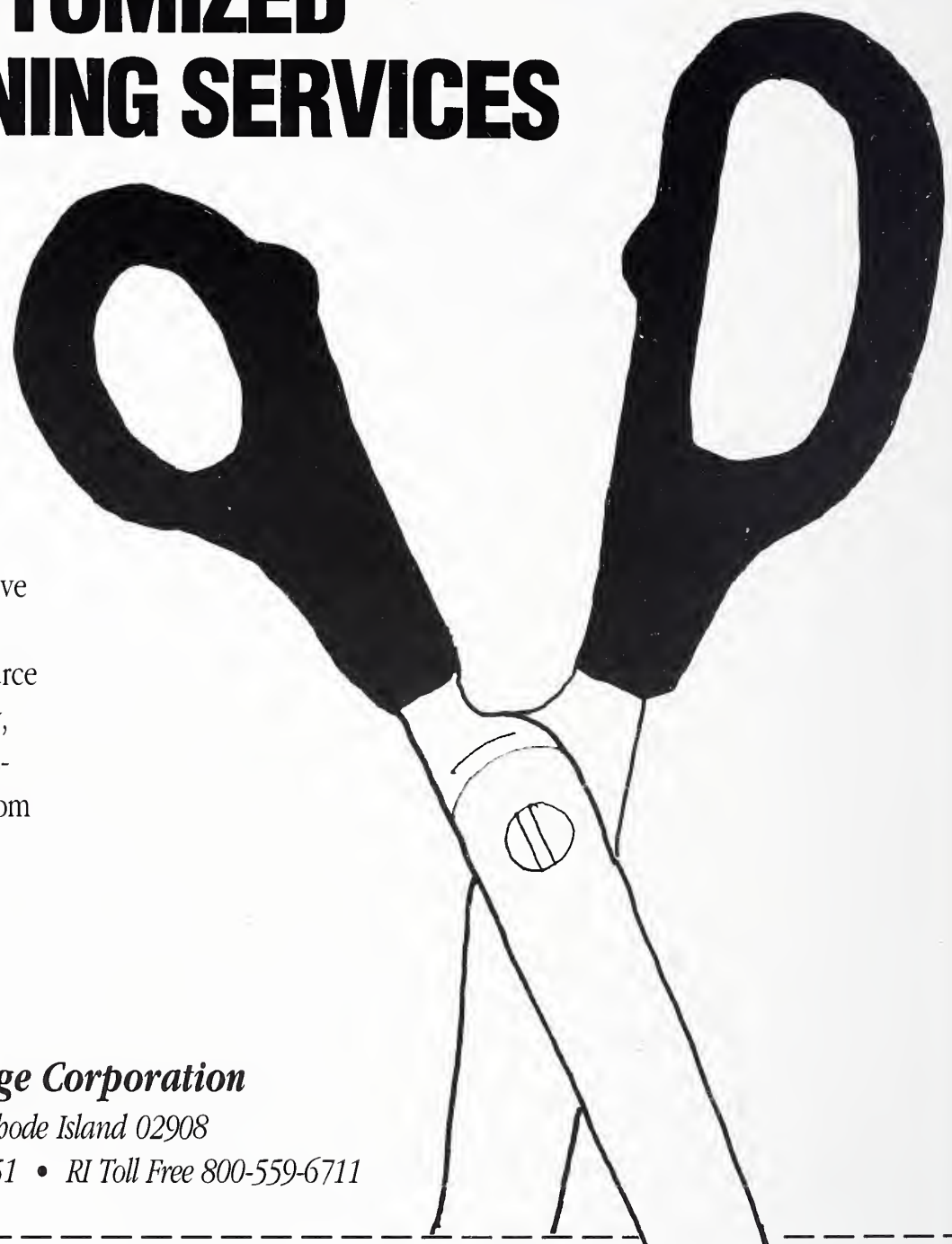

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Cover: Frontpiece of J. Graunt's 1662 text on Bills of Mortality

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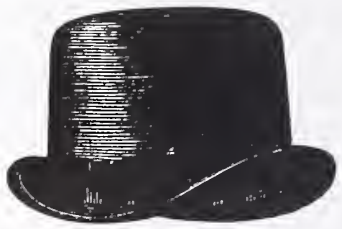
COMMENTARIES



The Haberdasher from Birchen Lane

The London of 1662 was a rude community of some 97 parishes clinging resolutely to both shores of the Thames estuary. It was a cesspool of a city bereft of central water supply, sewers, public health facilities or constabulary; a city, newly arrived visitors declared, which announced itself more by its odors than its edifices. Yet it was a city where Shakespeare's immortal words had just been freshly uttered, where Milton's puritanic poetry was taken in dictation and where Christopher Wren was designing noble buildings.

The London of 1662 was a turbulent community of about 384,000 persons. Charles II was newly restored to the Stuart throne after a long Cromwellian interlude. It was a time, too, of grievous pestilences, one overtaking the other. The dominant causes of death were all infectious: bubonic plague, small pox, French pox [syphilis], typhus, phthisic [consumption or tuberculosis], and flux [dysentery.] The average life expectancy of a Londoner surviving the first week of life was 19 years and only 7% reached the age of 50 years.

London was a city where Sydenham and Harvey practiced medicine, where Halley studied the stars, Newton refined his text on integral calculus and where Boyle devised the basic laws of the gases. Yet it was a city where little attention was directed toward the most rudimentary aspects of public health. John Graunt was born into this urban sprawl in the year 1620, son of a local tradesperson. He apprenticed to a haberdasher as a youth, showed remarkable mercantile talent and in time became one of London's principal storekeepers. The success of his many retail enterprises allowed Graunt to devote much of his time to a study of the affairs of his city and in 1660 he began a rigorous review of the dormant Bills of Mortality. These Bills were numerical summaries of the christenings, deaths [and their presumed causes] issued weekly by each of London's 97 parishes as well as by the 25 parishes beyond the city walls which enjoyed some of the privileges and immunities of the City parishes. The Bills were begun in 1592 by order of Queen Elizabeth but had been irregularly issued until 1603 when they were more meticulously maintained. Graunt acknowledged the laudable purposes of the Bills but noted too that no one had sought to organize the data or use it for any purpose. For over six decades these remarkable documents had lain idle until 1662 when Graunt published a modest 89-page text called *Natural and Political Observations Mentioned in a following Index, and made upon the Bills of Mortality.* This book, in the minds of many historians, represented the first effort to collate statistical data for a political region and from such information offer some generalizations regarding issues such as the timing of pestilential cycles, the growth rate of cities, the male:female ratios and their possible significance, patterns of rural-to-urban migrations, the relative causes of death in each age group, and the dispelling of certain demographic myths [eg, that more males are born shortly after wars thus, by divine intervention, to compensate for the selective "wasting" of males in combat; that plagues regularly begin with the arrival of new kings, etc.]

Graunt, as a private citizen, analyzed this immense body of disorganized information, moved by the novel belief that masses of data, even when gathered imperfectly, might still harbor important generalizations and permit hypotheses that one could not adduce from the study of individual reports. The very primitive idea of the regular counting of populations had not been adopted by any nation. The Bible mentions some isolated census-taking [cf. *Numbers* 1:2], and the Romans undertook a rare imperial census about two millenia previously, but few secular jurisdictions saw any merit in the consistent counting of births, marriages, deaths and incidence rates of diseases until the 1787 Constitution of the United States, Article 1, Section 2, paragraph 3 which mandated that a national census be undertaken every decade. [England did not hold its first government-sponsored nationwide census until 1801.] The founding fathers of the United States saw governmental demographic studies as the basis for determining tax rates, as an instrument for military recruitment, as the basis for the planning of future educational and public health needs, and, above all, for the equitable apportionment of representatives to Congress.

The Graunt 1662 text, for the first time, used information in the dormant Bills of Mortality to provide a sobering profile of the recurrent epidemics that beset 17th Century England. Graunt placed little reliance upon the credibility of the individuals who gathered these data [called the Searchers,

"*antient Matrons* " who, in Graunt's words, "*after the mist of a cup of ale and the bribe of a two groat fee*" were ill-suited to determine the causes of death with any accuracy. Nonetheless and with little beyond these weekly summaries Graunt was able to demonstrate such measures as population densities per parish, the effects of urban crowding upon survival [and the comparatively beneficial effects of rural life], the deliberate underestimation of certain diseases [eg, syphilis], the determination of migration rates from the rural shires to London, the fertility rates of London women, the relative burdens of homicide, suicide and starvation, the staggering loss of life in the brief interval between birth and christening, the enormous toll exacted by the plague [81,368 deaths in 57 years], and the unbridled population growth of London despite murderous pestilences.

Buried within this brief text is a quantitative contrivance that Graunt employed to convey graphically the age-related burden of mortality, a statistical compilation which today is called the life-table. On the basis of the ages at death of some 575,405 Londoners who had died between 1604 and 1661, Graunt calculated the percent surviving through each decade of life [eg, of every 100 conceived, 25 will be alive at age 26.]

Graunt's monumental book represents the first effort to gather and analyze immense amounts of raw demographic data; and, quite properly, it is regarded as the inaugural text of a new science called analytic epidemiology. Graunt proposes the following question at the onset of his concluding chapter: "*It may be now asked, to what purpose tends all this laborious buzzling and groping ?* " He answers by declaring that the Art of Governing demands knowledge of the land, its potentialities; and also the people, and the measurements of their lives. Should we not be wanting to know, " *How much Hay an Acre of every sort of Meadow will bear ? How many Cattel the same weight of each Hay will feed and fatten ?* " And, "*It is no less necessary to know how many people there be of each Sex, State, Age, Religion, Trade, Rank or Degree, by the knowledg whereof Trade and Government may be made more certain, and more Regular ?* "

– Stanley M. Aronson, MD

The Quaker Connection

Some 350 years ago a nonconformist English preacher named George Fox began a religious movement based upon the principles of simplicity, gender equality and the primacy of individual spiritual autonomy. He called his small group the Society of Friends; others, noting episodes of visible trembling which sometimes accompanied the inner spiritual experiences of his congregants, called them the Quakers. It was a curious faith without a defined canon or liturgy, and with neither established clergy nor visible sacraments. The movement never attracted many; indeed, in England, formal membership never exceeded 20,000. In prior centuries, Quakers were excluded from the English civil service because they dissented from the Church of England; and many Quakers, accordingly, concentrated in the trades, the philanthropies and in private education. Only in the British colonies of New Jersey and Pennsylvania did the Quakers achieve some political stature.

Despite their small numbers, members of this miniscule Christian sect, and especially their physicians, exerted a measureable influence upon the ethical texture of Western medicine and were a powerful force in the formative days of American medical education.

John Fothergill [1712-1780], son of a Quaker missionary, was born in Yorkshire, England. He chose medicine as his career but as a dissenter was excluded from the English universities and was hence forced to attend the medical school in Edinburgh. By 1740 he had established himself in London where his medical counsel was repeatedly sought. During the course of an extremely successful career he contributed materially to clinical medicine. His 1748 paper "*An Account of the Sore Throat Attended with Ulcers* " represented the first comprehensive description of what would later be called diphtheria [*morbus suffocans*]. His published studies on the effects of lead intoxication in house painters and his seminal paper on the relationship of coronary artery calcification and stenosis with angina pectoris represented some of the finest clinical writings of the 18th century. Benjamin Franklin, his friend, coreligionist and sometime patient, shared his curiosity concerning industrial lead poisoning and would later publish the first book in the colonies on lead poisoning.

Fothergill was a devout Quaker, devoting much of his energies to philanthropic causes [including contributions to the medical schools at Pennsylvania and Harvard Universities.] He was a leader in the English movement to abolish the slavery of Africans. He also had a scholarly interest in marine biology and particularly medicinal botany. Fothergill organized a formal arboretum on his Essex estate which in time became second only to Kew Gardens as England's most extensive botanical collection.

John Coakley Lettson [1744-1815] was initially trained at St. Thomas' Hospital, London, but then proceeded to Edinburgh and Leyden to complete his medical education. In

subsequent years Lettson became one of London's most illustrious practitioners. He wrote a number of influential texts on the pernicious and addictive effects of chronic alcoholism and was a leader in the nascent temperance movement. He also developed an interest in devising technics of artifical resuscitation especially after drowning or smoke inhalation. His many social concerns included prison reform. Lettson was noted for his philanthropy, particularly in sponsoring summer camps for indigent children and for his generosity to institutions of higher education in the United States. When Jenner's 1798 paper on vaccination appeared, Lettson became one of its leading advocates; and it was he who informed Benjamin Waterhouse [also a Quaker] of the salutary effects of this vaccine.

Benjamin Rush [1745-1813], signer of the Declaration of Independence, was born to a Quaker family near Philadelphia. Following a medical apprenticeship he travelled abroad in 1766 to Edinburgh for his formal medical education; and in 1768 he arrived in London to train further with John Fothergill and William Hunter. In the following year he studied in the hospitals of Paris, the costs underwritten by Benjamin Franklin. Upon his return to the States, Rush played an important role in the Revolution, in establishing this country's first medical school, in designing Philadelphia's herbarium, and in leading the movement to abolish slavery. In later years he wrote extensively on the dangers of ardent spirits, the health benefits of physical exercise and the need for an enlightened approach to mental illness.

Caspar Wistar [1761-1818] was another Quaker physician from Philadelphia who travelled to Edinburgh to receive his medical education. Upon his return he joined the faculty of the new medical school in Philadelphia becoming in time one its great teachers. He was Pennsylvania's leading spokesman for vaccination, aided in his advocacy by Thomas Jefferson. During his lifetime Wistar was chosen as president of the Society for the Abolition of Slavery. And because of his interest in botany, Nuttall named a new species of flowering vine [*Wistaria speciosa*] in his honor. The great Wistar Institute in Philadelphia perpetuates the name of this humanitarian.

Benjamin Waterhouse [1754-1846], from a Rhode Island Quaker family, voyaged to London in 1775 to apprentice in medicine both with his second cousin, John Fothergill and with Lettsom. Subsequently he travelled to Edinburgh and then to Leyden to complete his clinical studies. Upon his return to Rhode Island, he opened a medical practice while simultaneously joining the faculty of Rhode Island College [later to be called Brown University], teaching botany. A few years later he transferred to Massachusetts, joining the Harvard faculty and was cofounder, with Dexter and Warren, of its medical school. Through his correspondence with Lettson, he learned of the merit of Jenner's cowpox vaccine. In 1800 he received a small supply of the vaccine and was the first in the States to employ this preventive measure. Waterhouse wrote extensively on the medical dangers of smoking and hard liquor.

Two further English physicians, born to families in the Society of Friends, should be mentioned. Thomas Hodgkin [1798-1866] was a devout Quaker physician, educated in Edinburgh, a staunch advocate of the emancipation of slaves, and opposed to such indulgences as coffee and ardent spirits. In his lifetime he strove to improve the working conditions of shipboard crews and was a leader in the English prison reform movement. He viewed his description of a disease that later would bear his name as of but incidental importance.

Joseph Lister [1827-1912] was born in London of Quaker parentage. His father, a successful merchant, had worked with Hodgkin in their joint development of the achromatic lens. Young Lister trained in medicine both in London and Scotland ultimately assuming the chair in surgery at Edinburgh. During this interval he developed the principles of surgical antisepsis. He was the first English physician to be raised to the peerage, and as Lord Lister was also chosen as president of the Royal Society.

These seven Quakers were certainly outstanding physicians and surgeons; but they were also instrumental in strengthening medical education by establishing two of the first medical schools in the States. As proponents of preventive interventions, they were in the forefront of the vaccination movement on both sides of the Atlantic. They shared a zealous commitment to the abolition of slavery and were firmly opposed - on medical grounds - to the recreational use of alcoholic beverages and tobacco. They were vocal leaders, too, in the social movement for better housing, prison reform, universal suffrage and public education. Their separate lives on both shores of the Atlantic, spanning parts of three centuries, were curiously intertwined by personal friendships, shared interests in botany, attendance at the same medical school, by their extensive philanthropies, and their jointly held body of moral and spiritual convictions.

– Stanley M. Aronson, MD

Art and Disability

The value of using the arts in a healthcare setting has recently been the subject of numerous conferences, workshops, articles and exhibitions throughout the country. A conference is being planned here in Rhode Island to heighten awareness that the arts can play a valuable role in healing, and to explore the many existing bridges between the artistic and medical communities. The Society for the Arts in Healthcare, an organization which has played an important liaison role nationally, is helping a group of Rhode Island area artists and healthcare professionals produce *The Arts and Healthcare: A Partnership in Healing,* scheduled for April 26, 1997.

The conference will be hosted by the Hasbro Children's Hospital, which has been the site of several previous ventures linking the arts with a healthcare institution. It is designed for physicians, psychologists, therapists, nurses, health administrators, and artists. This conference is a continuing education activity sponsored by Rhode Island Hospital. The Rhode Island Hospital is accredited by the Rhode Island Medical Society to sponsor intrastate Continuing Medical Education for physicians. The Rhode Island Hospital designates this continuing medical education activity for 5 credit hours in Category 1 of the Physician's Recogntion Award of the American Medical Society.

The purpose of this conference is fourfold:

- To inform the community of the importance of the connection between the arts and healing,
- To identify regional resources which promote innovative ideas and programs concerning the arts and healthcare,
- To advocate for continuing research in the areas of arts and healing,
- To bring the idea of arts and healing to individuals and organizations with widely divergent ethnic, social, economic and health backgrounds.

The keynote speaker will be Michael Samuels, MD, geneticist, author, teacher and photographer. His published works include a number of influential medical guides for the lay audience (T*he Well Adult*, *The Well Body Book*, *The Well Pregnancy Book*, *The Well Baby Book*, *Take Charge of Your Arthritis*, *Take Charge of Your Heart Disease*, and *Take Charge of Your Hypertension)* . His other books, *Seeing with the Mind's Eye* and *Healing with the Mind's Eye*, explore the history, techniques and uses of visualization and their role in healing. A former student at Brown and a graduate of New York University College of Medicine, Dr. Samuels has maintained a private practice and consulted in guided imagery for patients with life-threatening diseases since 1975. He is the founder and director of the Art as a Healing Force program and is on the Boards of Commonweal, Tamalpa Institute, Philosophy and Medicine Program, Pacific Presbyterian Medical Center, and the Alpha Institute.

The conference will take place in the Rhode Island Hospital's George Auditorium, Hasbro Children's Hospital Lobby and Conference Rooms, and in the Hospital Cafeteria Saturday, April 26. Registration begins at 8:00 a.m. Several ongoing participatory visual arts events will take place during the day, including the display and creation of part of the AIDS quilt. Four workshops/lectures will be offered after the keynote address, with two post-lunch plenary sessions, followed by four additional workshops/lectures. Topics will include: Introducing Physicians to the Importance of the Arts in Healing, Research on Art that Heals, Using Visual Art to Tell the Story of an Illness, Creating Healing Environments Architecturally, The Hospital as Community Resource, The Arts in the Physical Therapy Setting, Connecting Sound with Healing, The Healing Arts at Hasbro Children's Hospital, Experiencing Art that Heals and The Creative Process and Mindfulness. Marketplace of Ideas will be an area for participants, vendors and local artists to display and share their programs and work. The conference will end with a reception between 4:00-5:00 pm.

Several art exhibitions will coincide with the conference. Virginia Lynch, owner of the Virginia Lynch Gallery in Tiverton, is curating a show, "Visions Toward Wellness," which will run April 25 to May 24. This exhibition will take place at the Dryden Galleries at Providence Picture Frame, the Attleboro Museum, Study Memorial Hospital in Attleboro, and other hospitals and public spaces in Rhode Island and the surrounding Massachusetts area. An opening reception will be held Friday, April 25, 5:00-8:00 pm at the Dryden Galleries. Other Providence galleries are also planning exhibitions on Art and Healing, and the American Heart Association will sponsor an exhibition for their April annual meeting which will highlight art as a means to educate and enlighten the public about cardiac health.

The Arts and Healthcare: A Partnership in Healing Conference - Saturday, April 26, 1997, at Hasbro Chidlren's Hospital, 8:00 am - 5:00 pm. Registration is $50. For further information, please call Paula Most, Art Coordinator for HCH, at (401) 444-3153.

– Christiane Corbat

Psychiatric Residents' Attitudes Toward a Strike at a Psychiatric Facility

Robert Kohn, MD, and Ronald M. Wintrob, MD

Strikes by hospital employees at psychiatric facilities are becoming increasingly common. A number of papers have dealt with the ethical dilemmas faced by health care professionals who go on strike.[1,2] Investigators have also examined the effect of hospital strikes on health care delivery.[3-5] A number of reports have focused on the ethics and reasons why physicians themselves may go on strike,[6-13] and similar studies have been done with residents.[9,10] Although possible strike situations continue to be an issue facing hospitals and physicians working in them, little is known about the attitudes of physicians toward strikes by other health care workers.

Residents are in a sensitive and ambiguous position in the event of a strike by nursing staff.[14] They work closely with attending physicians who are often required to provide medical care despite a labor dispute, as well as with the nursing staff which carries out the labor action. Yet they belong to neither group. Residents also are often not employees of the hospital, but of the university. Since residents frequently do not have clearly defined roles or expectations in hospital labor disputes, they are faced with the decision of whether or not to cross the picket line and help with the clinical care of their own and other patients.

Only one study to date has examined the attitudes of psychiatric residents toward a hospital strike.[14] This report was limited in its generalizability due to the small number of residents, and because its findings were based on a single labor strike by nurses and mental health workers. In the discussion of their findings, the authors cited the need for replication of their results.

This study, a replication of that earlier study, examines the attitudes of residents toward a labor dispute over wages and benefits between nursing staff and mental health workers on the one hand, and the management of a university-affiliated private psychiatric hospital located in a New England city. The affected hospital is the central administrative base for the academic Department of Psychiatry, where the offices of the residency training director and department head are located. Residents are also assigned to clinical rotations at this hospital as well as a number of other university-affiliated facilities. Most residents, however, get most of their on-call experience and are assigned for at least part of each year to one of the clinical services at the affected hospital. Residents also see their outpatients and have their seminars at this hospital, and spend more time there than at any other facility during the course of training. For these reasons the hospital affected by the labor dispute is considered synonymous with the residency program.

Abbreviations Used

PGY	Post-graduate year

Labor strikes create a period of uncertainty, anxiety and ambivalence as residents are made to re-evaluate their professional roles.

In 1992, union nurses and mental health workers threatened to go out on strike. The strike was averted only hours before it was to commence. The hospital management made preparations in the expectation that the strike would take place. These preparations included requesting attending physicians and residents to volunteer their time to provide additional clinical care for their own patients and others, as well as services normally performed by the nursing staff. Those physicians who volunteered would dispense and administer medications, carry out nursing charting, and provide supportive therapy normally done by psychiatric nurses. Residents were not obliged to assume additional clinical duties, although they were expected to fulfill their own clinical obligations, attend seminars, and provide on-call service at the hospital.

The residents were permitted by the hospital and residency administrators to decide their own course of action during the strike. Neither the residency director nor the chief resident advised residents as a group or individually on what course of action they ought to take in the event of a strike. Although the strike was called off at the last minute, each resident had already made a commitment to a course of action. This made possible examination of the roles and attitudes of the residents. We were able to examine both the residents' attitudes toward a strike by the professional staff, and how attitudes change based on role identification.

The program accepts eight to ten residents per year. At the time the labor dispute was to take place, 66.7% of the residents in the university's residency training program were assigned to a clinical rotation at the hospital where the strike was to occur. These residents were university employed, non-unionized, with salaries partially funded by the hospital.

Methods

A brief multiple-choice questionnaire was administered to all psychiatric residents to investigate their attitudes and behavior toward the expected strike. The validity of this questionnaire to probe the attitudes of the residents was demonstrated in an earlier study.[14] Modifications were made based on problems encountered in the earlier study. A cover letter introducing the questionnaire guaranteed anonymity. The questionnaires were distributed to the residents within a week of cancellation of the strike, and completed within two weeks.

Analysis was conducted using primarily nonparametric statistics, Mann-Whitney and the Wilcoxon signed rank test, with ordinal ranking of the response categories. The role that the number of years in the residency program had on the residents' attitudes was examined using multiple regression, as well as Pearson correlations.

Results

All residents (n = 27) completed the questionnaire. There were 15 males (55.6%) and 12 females (44.4%) in the residency program. The distribution of residents by postgraduate year (PGY) was as follows: PGY-1 = 2, PGY-2 = 10, PGY-3 = 9, and PGY-4 = 6.

Most psychiatric residents were philosophically neutral on the issue of whether health care professionals should strike in general (51.9%), as well as at this particular hospital (44.4%). Those who did take a position, however, were supportive of health care workers striking, 29.6% and 37.0%, respectively. Most residents were not opposed to attending psychiatrists assuming clinical responsibility of strikers (92.3%), nor of residents doing so (66.7%). However, residents were significantly less favorable about crossing the picket line as a resident than as an attending (Wilcoxon signed rank test, $z = -2.28$, $p \leq 0.006$). Half the residents would not object to assuming clinical responsibilities of striking workers to provide patient care. On the other hand, over one-third were opposed in principle, while 11% would do so in order not to antagonize their attending. Most residents did not feel that physicians should participate in health care worker strikes.

Male residents were less sympathetic of labor actions by a nursing staff that was predominantly female. Female residents viewed their professional identity to be closer to that of nurses.

In actuality only one-third of the residents had volunteered to assume some of the clinical responsibilities of the striking nursing staff, and more than half would not cross the picket line even for the purpose of providing clinical care for patients on their current clinical assignment. Fifteen percent would not cross the picket line for any reason; however, when the residents were asked to put themselves in the position of attendings, 41% would have volunteered to assume clinical care functions in place of striking nursing staff, and less than half would not have crossed the picket line. That is, if the residents were attendings their behavior would have significantly differed from what they would have done as residents with respect to volunteering (Fisher exact test, $p = 0.04$), and in becoming less likely to support the striking nurses (Fisher exact test, $p = 0.004$).

The most important issues to the residents in making a decision about what to do in the event of a strike were their sense of responsibility to care for patients (65.4%), followed by the union's and administration's positions (23.1%). Overall, it appeared that residents valued their relationship with their attendings more than those with the nursing staff in making their strike-related decision.

Because the hospital threatened by the strike was a private free-standing psychiatric facility, we gathered data from residents about whether the type of facility would influence the residents' attitudes and ultimately their behavior in the event of a strike. Most residents felt that all psychiatric hospitals, whether public or private, should remain operational during a strike (63.0%). Not surprisingly, they had a stronger view that public psychiatric hospitals should remain open compared to private ones (Wilcoxon signed rank test, $z = -2.50$, $p \leq 0.02$). This view of the greater importance of the public facilities remaining open and functioning during a strike by nursing staff was confirmed by including ratings on this issue for the different institutions affiliated with the training program, comparing those ratings for private and public hospitals, general and psychiatric hospitals, community-based and Veterans Administration facilities.

With few exceptions, residents did not believe that their behavior during a strike should have influenced subsequent decisions about their suitability for appointment as attending staff at any of the hospitals or other clinical facilities affiliated with the university training program. However, more than half thought it would have a generally deleterious effect.

The only individuals the residents seemed to identify as being helpful to them in the decision-making process were the residency director and the chief resident. They did not feel that other faculty, attending staff, or administrative staff were helpful.

Gender differences in the attitudes of the residents were found. Female residents seemed, in general, more supportive of health care workers striking (Fisher exact test, $p = 0.05$). When asked about this particular proposed strike, no gender differences, however, were found. Nor were gender differences noted on the question of attendings or residents assuming clinical responsibility of strikers. Decisions made in regard to the action the residents would take in this current labor

dispute were similarly unrelated to gender. Male residents, however, were more likely to volunteer to assume clinical responsibilities of striking nurses if they placed themselves in the position of an attending (Fisher exact test, $p = 0.03$), but did not differ in other strike-related attitudes.

Female residents viewed their professional roles as being closer to unionized nursing staff than did male residents (Mann Whitney test = 140.4, $p \leq 0.01$) - an effect independent of PG year. There was a trend in the data suggesting that the male-female professional role differentiation becomes most pronounced by the PG-3 year.

PG year had little influence on attitudes toward striking health care workers. There also was a trend for PGY-4s to be in favor of residents assuming the clinical responsibilities of striking workers to provide patient care. In a question that asked residents to view their professional roles retrospectively, the results of a correlation matrix found that as PG year increased residents viewed their role as being significantly closer to that of an attending psychiatrist.

Interestingly, loyalty to the institution was a more important consideration as PG year progressed ($F = 8.0$, $ß = -0.37$, $p \leq 0.01$). Yet their attendings' position on the strike became less of an issue as PG year progressed ($F = 5.6$, $ß = 0.34$, $p \leq 0.03$). Increasing PG year was related to believing that it was important to keep a psychiatric facility operational during a strike, including a private psychiatric hospital ($F = 4.7$, $ß = -3.0$, $p \leq 0.04$).

Being currently assigned to the hospital threatened by the strike had no differentiating influence on the attitudes of the residents.

Discussion

The results of this study are consistent with our earlier report.[14] Residents as a group were not willing to cross picket lines; however, this was not a fixed attitude, since the residents would change their position once they would become attending psychiatrists. Male residents were less sympathetic of labor actions by a nursing staff that was predominantly female. Female residents viewed their professional identity to be closer to that of the nurses.

Professional role identification also changed with PG year: the more senior the resident, the closer their identity to that of an attending psychiatrist. There also was a trend for PGY-4 residents to be more supportive of crossing the picket line, in the event of a strike by nursing staff.

Labor strikes create a period of uncertainty, anxiety and ambivalence, as residents are made to re-evaluate their professional roles. They are either left in a situation by their training programs where they must choose sides, or forced to side with their attendings when as residents they do not yet perceive themselves in such a role.

Those residents who have more recently graduated from medical school, who are most likely to be assigned to an inpatient service, feel themselves caught up in the turmoil of a labor action. Specifically, they find themselves in the awkward situation of being highly dependent on the non-physician staff for guidance and yet possibly having to side against individuals with whom they work closely. At the same time the residents may fear their professional future will be threatened if they do not take the same stance as their attending. As psychiatry residents progress toward the PGY-4 year, they feel less dependent on non-medical staff, since they are primarily assigned to outpatient services and are more involved in planning their post-residency careers. As residents near the end of their training and their professional identity is more solidified, the decision to act in much the same way as their attendings becomes less threatening.

Since no study has examined residents who were not given a choice in their action during a strike, it is unclear if physician role identification would ultimately be strengthened by requiring residents to cross picket lines to keep the hospital operational. Unfortunately, this study and our previous one are the only ones published to date that have examined these issues.

The present report deals with a different cohort of psychiatry residents than our earlier study. Nevertheless, issues of generalizability remain, since the same hospital was examined. Also, the pool of psychiatry residents studied remains small.

It is likely that attitudes of residents toward health professional labor strikes, and their professional role identification, may shift as the climate in mental health shifts focus from inpatient care. The resulting financial reorganization, hospital closings, and staff layoffs may make labor disputes more commonplace. An understanding of the attitudes of residents toward labor strikes may assist residency training programs, and ultimately the whole profession of psychiatry, to shape the development of the professional identity of psychiatrists in the years ahead.

References

1. Brecher R: Striking responsibilities. *J Med Ethics.* 1985;11:66-69.
2. Railton P: Health care personnel and the right to strike: A social perspective. *Progress in Clin Biol Res.* 1980;38:309-310.
3. Norman RM: The effect of a mental hospital strike on general hospital psychiatric services. *Psychol Med.* 1984;14:913-921.
4. Rosenberg G, Speedling EJ, Rehr H, et al: Some effects of a hospital employee strike on patient satisfaction. *Mt Sinai J Med.* 1985;52:259-264.
5. Schlosberg A, Zilber N, Avraham F: Effects of a psychiatrists' strike on emergency psychiatric referral and admissions. *Social Psych and Psych Epidemiology.* 1989;24:84-87.
6. Cofler H: On the physician's right to strike. *Prog in Clin Biol Res.* 1980;38:303-307.
7. Sachdev PS: Doctors' strike - an ethical justification. *New Zealand Med J.* 1986;99:412-414.
8. Arnold P: Australian doctors on strike. *Brit Med J.* 1984;289:175-177.
9. Drobinski G, Thomas D, Gregogeat Y: Medical strikes in France. *Annals of Internal Med.* 1983; 99:862-863
10. Gapen P: The Committee of Interns and Residents New York's big, brash union. *New Physician.* 1981;30:14-18.
11. Grosskopf I, Buckman G, Garty M: Ethical dilemmas of the doctors' strike in Israel. *J Med Ethics.* 1985;11:70-71.

12. Sinclair A: The Ontario doctors' strike. *Can Med Assoc J.* 1986;135:429-450.
13. Kravitz RL, Shapiro MF, Linn LS, et al: Risk factors associated with participation in the Ontario, Canada doctors' strike. *AJPH.* 1989;79:1227-1233.
14. Kohn R, Wintrob RM: Attitudes of psychiatry residents toward a strike by nursing staff: a case report. *Acad Psych.* 1991;15:87-93.

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Medical Students and Managed Care: One School's Experience

Garey H. Noritz, AB

ABBREVIATIONS USED

AAMC	Association of American Medical Colleges
AMC	Academic medical center
BUSM	Brown University School of Medicine
HMO	Health maintenance organization
POS	Point of service organization
PPO	Preferred provider organization

The growth of managed care organizations has had a profound effect on the way in which many Americans receive their health care. Managed care has been defined as "any system that manages the delivery of health care in such a way that costs are controlled."[1] These organizations include health maintenance organizations (HMOs), preferred provider organizations (PPOs), and point of service organizations (POSs).[2] Researchers have predicted that most Americans will receive care through managed care delivery systems by the time that current medical students enter practice.[2,3] Accordingly, physicians will be more likely to become part of managed care networks.[4] Graduating medical students must be prepared to enter a profession in which the practice of medicine will be balanced against some form of cost constraint.

Current paradigms of medical education may be inadequate to meet the staffing needs of the growing numbers of managed care organizations. Medical education has traditionally been conducted in academic medical centers (AMCs), which are tertiary care facilities that conduct research and education in addition to delivering patient care. This leads to higher cost for services, which are avoided by managed care organizations in favor of community hospitals where services cost less since patient care fees do not subsidize other missions of the hospital. Patient censuses at AMCs have decreased as the use of managed care has increased. The decrease in patient load has jeopardized the future of some residency programs.[5,6]

The changes in health care provision have also changed the types of patients that medical students encounter in AMCs. Many disorders that once were treated in hospital wards are now treated almost exclusively on an outpatient basis. The traditional concentration on learning inpatient care is no longer adequate to meet the needs of future physicians.[7,8]

In addition, managed care organizations rely on primary care physicians to provide most of the care to their clients.[9] However, American

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medical schools are geared towards producing more specialist physicians. The majority of medical school faculty (and role models) are specialists, and most clinical instruction takes place in the acute care setting. There is less exposure to the management of chronic conditions, preventive medicine, and other types of medicine that are primarily conducted by generalist physicians. Fifty-five to sixty-three percent of medical school graduates say that they had inadequate training in preventive medicine.[7] The lack of exposure to the managed care setting, and physicians who work in that setting, coupled with a preference for specialty practices, are less likely to produce medical school graduates who are a good match for managed care practices.[2,10] Skills learned in AMCs are often very different from those that are needed to practice in managed care organizations.[7]

Several medical schools have begun to tailor their curriculums to the increased need for primary care physicians.[7] The American Association of Medical Colleges (AAMC) has suggested that medical schools expand their students' exposure to the managed care setting, teach the principles of cost-effective diagnosis and treatment, and increase the proportion of graduates going on to generalist careers.[11] Whyte and Cantor contend that managed care principles must be taught in medical school, and that "on the job training" after graduation is not as effective.[8]

A survey of managed care organizations found that leaders of HMOs would prefer that physicians have more experience with the cost-effective use of diagnostic and treatment services and with utilization review.[12] Gumbiner, the head of a large managed care organization, has found that medical school graduates are too narrowly trained and too dependent on technology to be good matches for managed care programs.[13] These authors concluded that future needs for HMO staffing should be taken into account when planning medical students' curriculum. An increased exposure to the practice of medicine in the managed care setting during the medical school years would serve this purpose.

The goals of this study were to gauge the opinions of students from one medical school (Brown University School of Medicine) regarding managed care, their exposure to managed care systems in medical school, and their perceptions of how managed care was addressed during their medical education.

Graduating medical students must be prepared to enter a profession in which the practice of medicine will be balanced against some form of cost constraint.

Methods

The Brown University School of Medicine (BUSM) has an enrollment of 320 students. The students are predominantly white and Asian. Only 30 students (9.4%) identify with another minority group. One hundred sixty-three (51%) of the students are female. BUSM, the only medical school in Rhode Island, is affiliated with eight teaching hospitals.[14]

This research was conducted through the Office of Curriculum Affairs, but respondents' specific answers were kept confidential. Respondents were chosen in a stratified random sample from the *Brown University School of Medicine Directory of Students.*[15] From each class, every fifth student on the alphabetical list was chosen as a potential respondent. Respondents were contacted in person or by phone. If the student was unreachable after repeated phone calls, the next person on the alphabetical list was contacted. Attempts to interview students were made from January to March 1996.

Students were interviewed using a 10-item questionnaire developed specifically for this study. It consisted of two demographic questions (gender and year); one open-ended question (settings in which the student was exposed to managed care); and seven Likert- scaled questions measuring exposure to and opinion of managed care by the students and their professors.

Data Analysis

Data were entered and analyzed on SPSS-PC for Windows. Analysis included both frequency tabulations and cross-tabulations. The dependent variables for cross-tabulations were stage in medical school (first- and second-years or third- and fourth-years), gender, and level of exposure to managed care systems.

Results

Fifty-three medical students were interviewed during the two months of the study, comprising 16.6% of the medical student population (Table 1). This number represented 82.8% of the target response. No student declined to participate. The sample was comprised of slightly more third- and fourth-year students than first- and second-year students. Fifty-nine percent of those responding were third or

Table 1

Demographic Comparison of the Sample to the School[14,15]

Demographic Characteristic	Sample (n=53)	School (n=320)
First-years	26%	22%
Second-years	15%	21%
Third-years	34%	30%
Fourth-years	25%	28%
Women	51%	51%
Men	49%	49%

Table 2

Levels of Managed Care Exposure

Type of Exposure	Often	Sometimes	Rarely	Never
Managed Care Patients	8%	37%	37%	18%
Managed Care Physicians	11%	38%	34%	17%
Managed Care Discussions	19%	32%	38%	11%
Consideration of Costs in Clinical Setting*	47%	44%	9%	0%
Predicted Effect on Future Career	78%	16%	6%	0%

*Only third- and fourth-year students responded to this question.

Note: Percentages may not add to 100 due to rounding.

fourth year students. In terms of gender, the sample was split evenly between males and females.

The students reported great variation in the types of managed care experiences in which they had participated. The most oft-cited exposure to the managed care experience was in noncurricular venues. Seventeen students reported that they had experience with managed care through their own personal health insurance, outside conferences, medical journals, the popular media, or other experiences outside the curriculum. Two students reported discussing managed care during their residency interviews.

Eleven students reported discussion of managed care concepts during the first year course in Social and Behavioral Sciences. However, the format of this course has changed, and it does not currently incorporate discussion of managed care. Seven students reported that they had studied various aspects of managed care during their undergraduate years, and seven students reported discussing it in their "Affinity Groups," which are groups of 7-10 students and one or two faculty members that meet regularly to discuss topics of mutual interest or concern.

The individual student's amount and type of exposure to managed care varied because the multiple clerkship sites are randomly assigned. For instance, some students had their core pediatrics clerkship at a local HMO. Others had their outpatient segment in a private physician's office and reported no exposure to managed care in this clerkship. Ten students reported significant exposure to managed care in the core internal medicine clerkship, while others reported exposure to managed care in the core clerkships of community health (5), family medicine (4), obstetrics and gynecology (4), surgery (2), and psychiatry (1). Others reported exposure in various elective rotations such as emergency medicine, orthopedics, and ophthalmology.

Only 8% of respondents reported that they had "a lot" of exposure to patients being treated in the managed care setting, while 37% reported "some" exposure, and an equal proportion reported "little" exposure (Table 2). Eighteen percent reported "no" exposure to patients in the managed care setting. This variable did not vary by gender, but it was affected by the respondent's year of training, since third- and fourth-year students have considerably more experience in the clinical setting. Almost identical results were found for the respondents' exposure to physicians who practice in the managed care setting, but the responses did not vary by the student's year.

Nineteen percent of respondents stated that their instructors, both clinical- and pre-clinical, "often" discussed managed care. Thirty-two percent stated that instructors discussed it "sometimes," 38% discussed it "a little," and 11% had instructors that never discussed managed care. This response did not vary by gender, but third- and fourth- year students reported significantly more discussion of managed care. Surprisingly, the amount of discussion did not vary by the student's level of exposure to managed care doctors or their patients.

Third- and fourth-year students were asked how often they consider the costs of tests or treatments when writing orders for patients under their care. All students stated that they consider costs at least some of the time. Forty-seven percent stated that they "often" consider costs, while 44% stated that they "sometimes" do. Only 9% stated that they "rarely" consider costs. Consideration of costs did not vary by gender or level of exposure to the managed care setting.

Table 3

Attitudes and Perceived Attitudes Towards Managed Care

	Favorable	Mixed	Unfavorable
Students' Attitudes	12%	75%	14%
Students' Perceptions of Instructor's Attitudes	2%	61%	37%

Note: Percentages may not add to 100 due to rounding.

All students were asked to describe their perceptions of their instructors' attitudes towards managed care (Table 3). Only one respondent (2%) stated that her instructors had a "favorable" attitude towards managed care. Thirty-seven percent reported that their instructors had an "unfavorable" attitude towards managed care, while 61% thought that their instructors' attitudes were mixed. The interpretations of instructors' attitudes did not vary by gender, year in school, or exposure to the managed care setting.

The students' own opinions of managed care were slightly better than their instructors. Twelve percent reported that they had a "favorable" atti-

tude towards managed care, while only 14% reported an "unfavorable" attitude. Seventy-five percent reported a "mixed" attitude. Several students attributed their mixed feelings to the fact that they were confused about what constitutes managed care. Student attitudes did not vary by gender, year in school, or exposure to the managed care setting.

All of the respondents reported that they expected managed care to have some effect on their future practice of medicine. Seventy-eight percent of the students reported that they expected managed care to have a major effect. This expectation did not vary by gender, year in school, or exposure to the managed care setting.

Discussion

All results presented from this study must be interpreted in light of the limitations resulting from the survey method. A relatively small number (53) of medical students were interviewed at the Brown University School of Medicine. The study fell short of its goal of interviewing one of every five students in a random fashion. Students who did not return repeated phone calls were not interviewed, and nothing can be inferred about their opinions towards or experiences with managed care. In addition, the catchment area of Brown's hospitals is highly penetrated by the managed care industry, exposing students to more managed care opportunities than might be found at other medical schools.[16]

The results suggest that a relatively small fraction of medical education is geared towards preparing graduates for the practice of managed care, despite the indicators that many will practice in that environment. Students' exposure to managed care physicians, patients enrolled in managed care plans, and instruction in the managed care setting varied widely. The variation was largely based on the disparate clinical experiences of the students. Much of the third- and fourth-year curriculum is individualized since students rotate through different hospitals and specialities and work under different instructors. For example, those students who rotated through the pediatrics program at a local HMO had a much different experience with managed care than those who had their clerkship in other settings. There is no systematic attempt to expose all students to the managed care environment.

Several respondents stated that they often weren't aware if their patients were members of managed care organizations and that they concentrated on the more clinical aspects of medicine. However, all students stated that they considered the costs of the tests or treatments that they ordered. This suggests that the ability to work within cost constraints is being taught in several venues of medical education, not just those exclusively within managed care organizations.

In general, students reported mixed feelings about managed care, leaning towards an unfavorable opinion. Most students also felt that their instructors had mixed-to-unfavorable feelings towards managed care. These are both unfortunate findings because of the likelihood that many of the students will practice in the managed care environment when their training is completed. All students predicted that managed care will affect their future practices, and an overwhelming number thought it would have a large effect.

This limited amount of data provides a cross-sectional picture of the attitudes towards and experiences with managed care by students at one medical school. Cost containment is being taught in both the managed care environment and in other facilities that are not regarded as "managed care". Without a formalized program of exposure to the principles of managed care, many students receive little training in the type of skills that they may need in later years as physicians in the managed care environment.

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References

1. Kongstvedt PR. *The Managed Health Care Handbook.* Rockville, MD: Aspen Publishers, 1989.
2. Reid WM, Hostetler RM, Webb SC, Cimino PC. Time to Put Managed Care into Medical and Public Health Education. *Acad Med.* 1995; 70:662-4.
3. Cohen JJ. Educational Mandates From Managed Care. *Acad Med.* 1995; 70:381.
4. Ginzberg E. The Future of Health Care Reform. *West J Med.* 1994; 161:71-3.
5. Inglehart JK. Rapid Changes for Academic Medical Centers. *N Eng J Med.* 1994;331:1391-5
6. Howard RJ. May You Live in Interesting Times: Academic Medical Centers, Academic Societies, and the Coming Dominance of Government and Business in American Medicine. *Arch Surg.* 1994; 129:1123-30.
7. Moore GT, Inai TS, Ludden JM, Schoenbaum SC. The "Teaching HMO": A New Academic Partner. *Acad Med.* 1994; 69:595-600.
8. Whyte JJ, Cantor MD. Grappling With Managed Care: Where Does Medical Education Fit? *Pa Med.* 1992; 95:24-5.
9. Bindman AB. Primary and Managed Care: Ingredients for Health Care Reform. *West J Med*. 1994; 161:78-82.
10. Redington TJ, Lippincot J, Lindsay D, Wones R. How an Academic Health Center and a Community Health Center Found Common Ground. *Acad Med.* 1995; 70:21-6.
11. American Association of Medical Colleges Executive Council. Roles for Medical Education in Health Care Reform. *Acad Med.* 1994; 69:512-5.
12. Jacobs MO, Mott PD. Physician Characteristics and Training Emphasis Considered Desirable by Leaders of Health Maintenance Organizations. *J Med Educ.* 1987; 62: 725-31.
13. Gumbiner R. Perspectives of an HMO Leader. *Inquiry.* 1994; 31:330-3.
14. Brown University School of Medicine, Office of External Affairs. *Facts About Brown University School of Medicine: 1995-96.* Providence, RI: Brown University, 1995.
15. Brown University School of Medicine, Office of Student Affairs. *Brown University School of Medicine Directory of Students: 1995-96.* Providence, RI: Brown University, 1995.
16. Data Watch. HMO Enrollment. *Hosp Health Netw. 1994; 68:56.*

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A Humerus Break from the World of Medicine

Tina Kenyon, MSW, LICSW, and Stephen Davis, MD

Although people have been misusing words ever since people have used words, the first official misuse occurred in Richard Sheridan's 1774 play, "The Rivals,"[1] when Mrs. Malaprop tells young Lydia to "forget this fellow; to illiterate (i.e. obliterate) him...from your memory." The term malapropism refers to a word unintentionally used in place of a similar word, sometimes with humorous consequences. (The word "malaprop" is from the French "mal" = badly and "a propos" = to the purpose.)

Everyone uses malapropisms. In his campaign visit to Rhode Island this past summer, even the President of the United States commented that Rhode Island is a state that is taking the initiative to prevent "drive-by pregnancies." Presumably, he was referring to legislation to prevent "drive-by deliveries," that is, too brief post-partum hospitalizations.

Not only are these often amusing phrases uttered by politicians, but also by colleagues and by the authors.

One of us found himself agreeing with a colleague's choice of the use of the presumed cephalosporin "Unicef" to treat a child's infection. Unicef may, indeed, be helpful to children, but probably through a different mechanism. (Other antibiotics that we have heard include "dyslexicillin" and "Arethamycin.") The other of us found herself asking the state Medical Examiner to "take a stab" at teaching residents.

Recently, a well-respected family physician in a leadership role was introducing a renowned speaker, and highlighting the speaker's remarkable accomplishments. In an attempt to underscore the many pursuits in which the speaker is involved, the physician combined the phrases, "irons in the fire" and "balls in the air," and described the speaker as having his "balls in the fire."

In the hectic setting of health care, phrases both spoken and written can unintentionally take on new twists. Medical encounters are often brief, packed with information, and laced with confusing medical terminology. As such, they are ripe for malapropisms. For example, a patient related to a friend that her doctor suggested that she attend a "smoking sensation" course instead of a smoking cessation course.

... a health care provider may be cued by a malapropism to explore anxiety that may not be openly expressed.

Social situations can also lead to terms being confused: a woman who was grateful for being asked to stay with a friend combined "putting me up" and "having me over," into "putting me over."

Similarly, in the pressure of the clinical encounter, anything can happen to words: one patient stated that "now the shoe is turned" (or is the table on the other foot?), and someone else suggested she felt like "telling him to go jump off a river." Another patient described that she and her husband had had a "falling down last night" ("falling out" is the usual expression), and a woman decided that she and her family would "burn that bridge" when they got there. One man expressed frustration that he became an "escape goat," and someone else wanted a friend to "get to the point and stop beating that bush around."

Complex medical terms may lead to interesting interpretations by people who have a limited grasp of medical terminology. Some of the classics are, of course, "genetic" drugs, "prostrate" problems, "65 roses" (cystic fibrosis), and "smiling might Jesus" (spinal meningitis). Other phrases that we have heard or that have been shared with us are:

"My father died of a cerebral hemorrhoid."

"I have been diagnosed with prestigious anemia."

On a Lasix prescription, the instructions said it was for "water tension."

"The smoke exasperated his asthma."

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"I have a blood clog in my leg."

"My son gets mind-grain headaches."

"I'm having contraptions, and I need my epidermal."

"I have very coarse veins."

"The doctor had me get a Barrington enema."

"I need to have a threadmill test."

"I've got fireballs in my Eucharist (fibroids in my uterus)."

A young man with a fast heart beat reported that they put a halter top on him to figure out why.

Actually, upon hearing these explanations, a provider can inquire what the patient's or family's interpretations are, and take some time to clarify their understanding.

Anxiety in the medical encounter, which presents itself to varying degrees, can cause some patients to reveal their true feelings as in: "I haven't had a Pap scare in a long time."

"We decided not to have an autopsy, because he was already dead."

"My discharge started last week, but I only noticed it today."

"Doc, I had my Valium stress test."

"Will I need a resurrectomy?"

"My husband had a vicectomy."

A woman who has having trouble seeing (and possibly hearing) made an appointment to get her "Cadillacs" (cataracts) done.

"What is going to happen to me down the drain?"

"I'm using the Trifaithful birth control pill."

"I'm trying to be healthier: I've been drinking non-decaffeinated coffee."

An Rh negative prenatal patient came in to get her "Rhogaine" shot.

A patient reported that her father died of "sea roaches" of the liver.

In reporting a vaginal discharge to a triage nurse, the patient was certain that it was not a sexually transmitted disease since she is married, and she and her husband are "monotonous."

Another young woman wondered if her "introverted" uterus was responsible for her infertility.

In addition, a health care provider may be cued by a malapropism to explore anxiety that may not be openly expressed. These observations of "twists" in the expression of language are amusing, yet they can also have a role in helping providers to understand their patients and their own clinical styles better.

We thank the people who have contributed to our collection.[2,3] If you have come across any malapropisms, we would be interested in hearing about them.

References

1. Sheridan, R. *The Rivals.*
2. Davis, S & Kenyon, T. Medical malapropisms (or a stitch in time gathers no moss), *J Fam Pract* 40(2),1995:119-120.
3. Kenyon, T & Davis, S. Medical malapropisms: The sequin (sequel). *J Fam Pract* 41(2),1995:193-194.

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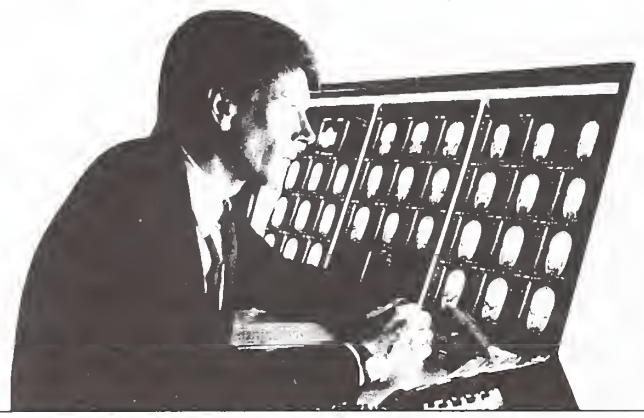

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Rate of Vaginal Births Among Women with Previous Cesarean Deliveries

Jay S. Buechner, PhD

A national Healthy People 2000 objective for maternal and child health is to reduce the rate of cesarean deliveries to no more than 15% of all deliveries.[1] The rate of cesarean deliveries in the United States increased in every year from 1965, when the rate stood at 4.5% of deliveries, until 1988, when the rate peaked at 24.7% or just under one-quarter of all deliveries.[2,3] By 1994, the rate had fallen slightly to 22%. Although there is no consensus as to an ideal cesarean delivery rate, there is considerable agreement that the current rate can be reduced without adversely affecting maternal and child health.

A substantial number of cesarean deliveries are repeat cesarean deliveries among women who have had a previous cesarean. As recently as 1987 in the United States, over 91% of women with a previous cesarean delivered by cesarean, and under 9% delivered vaginally.[3] In order to reduce the overall rate of cesarean deliveries, the rate of vaginal births among women with previous cesarean deliveries (VBAC) must increase. Accordingly, the Healthy People 2000 objective for cesarean deliveries has a sub-objective to reduce the rate of repeat cesarean deliveries to no more than 65%, i.e., increase the VBAC rate to at least 35% by the year 2000.[1] As of 1994, when the VBAC rate was just under 30%, this goal was within reach but had not been achieved at the national level.[3]

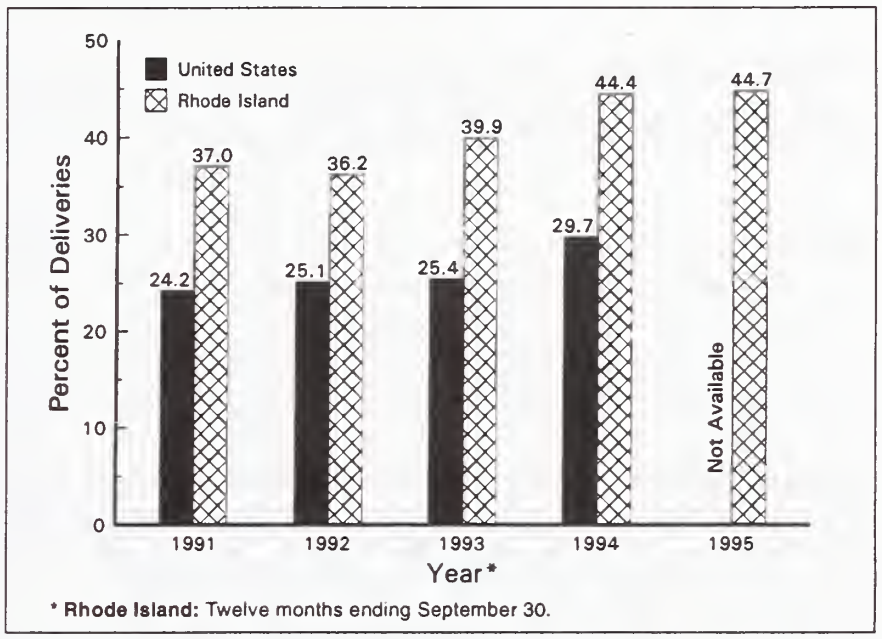

Figure 1. Percentage of Vaginal Deliveries among Women with a Previous Cesarean Delivery, by Year, United States and Rhode Island, 1991 - 1995.

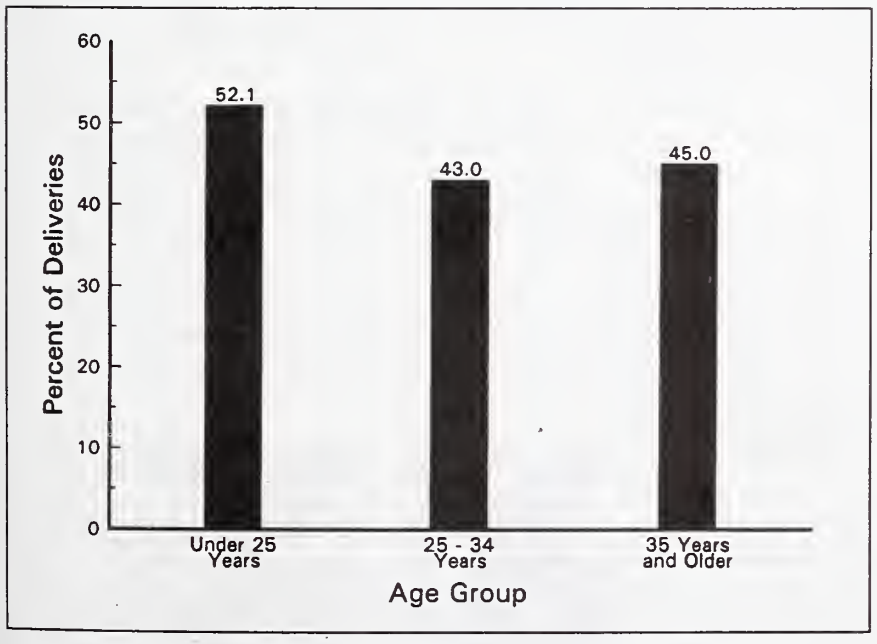

Figure 2. Percentage of Vaginal Deliveries among Women with a Previous Cesarean Delivery, by Age Group, Rhode Island, 1995.

Methods

National data and data comparing states were extracted from published sources.[2,3,4] Rhode Island data were produced by analysis of discharge data for the period October 1, 1990, through September 30, 1995, submitted from all acute care general hospitals in the state. These data were analyzed on the basis of five twelve-month periods ending September 30 with concentration on the most recent period. Deliveries, cesarean deliveries, deliveries with previous cesarean sections, and VBAC rate are defined in Table 1.

Table 1

Definitions of Measures

Measure	Definition*
Delivery	Discharge with principal diagnosis codes in the range 640 - 676 with a suffix indicating delivery
Cesarean delivery	Deliveries with any procedure code in the range 74.0 - 74.2 or equal to 74.4 or 74.99
Delivery with previous cesarean delivery	Deliveries with any diagnosis code within the classification 654.2
VBAC rate	Number of vaginal deliveries with previous cesarean delivery divided by total deliveries with previous cesarean delivery, expressed as percentage

*Diagnoses and procedures are coded in the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).

Results

Among deliveries in Rhode Island hospitals, the VBAC rate has exceeded the year 2000 target for the most recent five years for which data are available, reaching nearly 45% in 1995. (Figure 1) This performance placed Rhode Island among the top ten states in 1993, when VBAC rates reported on birth certificates ranged from 11% in Louisiana to 40% in Alaska.[4]

VBAC rates in Rhode Island in 1995 varied among hospitals and by age group. The highest VBAC rate, over 51%, was reported by the Women and Infants Hospital, at which 64% of the state's deliveries and over 76% of the state's VBAC's occur. At other hospitals, the VBAC rates varied from 17% to 44%. There was less variation in the VBAC rate by age group, with both younger and older women having higher rates than women ages 25 to 34 years. (Figure 2)

Few instances of adverse outcomes were reported for VBAC's or attempted VBAC's in 1995. Out of 727 women reported as attempting VBAC's in Rhode Island hospitals, 706 delivered vaginally and 21 resulted in cesarean deliveries after a failed trial of labor. In one case a disruption of the previous cesarean scar occurred. Average length of stay for VBAC's (2.1 days) was slightly longer than for other vaginal deliveries (2.0 days) and considerably shorter than for repeat cesareans (3.8 days) or primary cesareans (4.6 days).

Discussion

Where appropriate, VBAC's reduce the risks of maternal mortality and morbidity and of perinatal morbidity, while minimizing the use of health care resources. Although a low VBAC rate does not necessarily indicate inappropriate utilization of cesarean deliveries, it may identify populations where VBAC rates may be increased. Guidelines issued by the American College of Obstetricians and Gynecologists recommend that in the absence of contraindication, women with one previous cesarean delivery with a low transverse incision should be counseled and encouraged to attempt labor in their current pregnancy, with an expected success rate of 50-80%.[5] Data for Rhode Island indicate that these guidelines are being adopted by most health care providers, with the resulting VBAC rates approaching the expected outcome.

References

1. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington, DC: U.S. Dept. of Health and Human Services. DHHS Pub. No. (PHS) 91-50212. September 1990.
2. Pokras R, Kozak LJ, McCarthy E, Graves EJ. *Trends in hospital utilization: United States, 1965-86.* National Center for Health Statistics. Vital Health Stat 13(101). 1989.
3. National Center for Health Statistics. *Healthy People 2000 Review, 1995-1996* (and preceding issues). Hyattsville, MD: Public Health Service. 1996.
4. Clarke SC, Taffel SM. State variation in rates of cesarean and VBAC delivery: 1989 and 1993. *Statistical Bulletin* 77(1):28-36, 1996.
5. American College of Obstetricians and Gynecologists. Committee on obstetrics: Maternal and fetal medicine. Guidelines for vaginal delivery after a previous cesarean section. ACOG Committee 64: 1-2, 1988.

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Erratum

In the January "Health by Numbers: Health Risks Among Low-Income Rhode Island Adults," part of the definition of low-income was omitted (page 39). The full text:

"Low-income households were defined as those with a total income below 185% of the federal poverty level for 1995. For example, a two-person household with an annual income of $19,166 is at 185% of the poverty level ..."

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Proposed Colorectal Cancer Screening Recommendations

Sonia Uchman, MD, Leslie Cashel, MD, and Joann M. Lindenmayer, DVM, MPH

Objective

The Rhode Island Department of Health assembled an Expert Panel on Cancer Screening to advise the Department on revising the State's current cancer control plan, published in 1989.[1] After reviewing the current screening recommendations of national organizations and the most recent pertinent literature, the Panel proposed a recommendation for colorectal cancer screening.

Methods

- Review current colorectal cancer screening recommendations of national organizations.
- Review the most recent literature pertinent to colorectal cancer screening.
- Discuss.
- Propose a colorectal cancer screening recommendation for the State's cancer control plan.
- Write a simple rationale for the proposed colorectal cancer screening recommendation.
- Invite comments on the proposed recommendation and rationale.

Current Colorectal Cancer Screening Recommendations

Organization	Recommendations
U.S. Preventive Services Task Force[2]	• Screening for colorectal cancer is recommended for all persons aged 50 and older with annual fecal occult blood testing (FOBT) or sigmoidoscopy (periodicity unspecified), or both. • Persons with a family history of hereditary syndromes associated with a high risk of colon cancer should be referred for diagnosis and management.
American Cancer Society, American Gastroenterological Association, American Society for Gastrointestinal Endoscopy, American College of Obstetricians and Gynecologists	• For all persons, annual digital rectal examination should begin at age 40, annual FOBT should begin at age 50, and sigmoidoscopy every 3 to 5 years should begin at age 50.
American College of Physicians	• Persons aged 50 to 70 should be offered a variety of screening options depending on local resources and patient preferences. These options include flexible sigmoidoscopy, colonoscopy, or air-contrast barium enema, repeated at 10-year intervals. Annual FOBT should be offered to persons who decline these screening tests. • There is little benefit of continuing endoscopic screening after age 70 in persons who have been adequately screened up to that age.
American College of Radiology	• Screening with barium enemas every 3 to 5 years is an appropriate alternative to periodic sigmoidoscopy.
Canadian Task Force on the Periodic Health Examination	• There is insufficient evidence to support screening of asymptomatic individuals over age 40, but persons with a history of cancer family syndrome should be screened with colonoscopy.

Proposed Rhode Island Recommendations

- All persons should receive an annual digital rectal examination beginning at age 40.
- All persons 50 years of age and over should receive fecal occult blood testing annually and flexible sigmoidoscopy to 60 cm every 5 years. Persons positive by either screening test should be referred for colonoscopy.

- Persons at elevated risk for the development of colorectal cancer should be referred for diagnosis and management if there is:
  - a family history of hereditary syndromes associated with a high incidence of colon cancer (polyposis syndromes),
  - at least one first degree relative with colon cancer,
  - a personal history of colon adenomas or colon cancer,
  - inflammatory bowel disease involving the colon.

Rationale

When the Rhode Island Cancer Control Plan for 1990-1992 was published, the Director of Health determined that as of the date of publication of the plan, trials of widespread screening for colorectal cancer had not demonstrated its effectiveness in reducing mortality from the disease. Since that time, results of several studies have provided compelling evidence for the effectiveness of two principal screening tests currently in use for colorectal cancer—fecal occult blood testing (FOBT) and sigmoidoscopy—in reducing mortality from colorectal cancer. Although digital rectal examination is widely used for detecting colorectal cancer, the sensitivity of this test is extremely low, principally because fewer than 10% of colorectal cancers can be palpated by the examining finger.[3] The proposed recommendations are based on the following information:

- Established risk factors for colorectal cancer—older age, male gender, inflammatory bowel disease, hereditary conditions such as polyposis syndromes, and having a family history of colorectal cancer—do not lend themselves to prevention. Other potential risk factors such as dietary fat, alcohol, sedentary lifestyle, and obesity are presently under investigation for the primary prevention of colorectal cancer.
- Improvements in fiberoptic technology in the past few decades have made it possible to detect premalignant lesions or diagnose colorectal cancer at an early stage. Earlier lesions are now being discovered more frequently than in previous decades. Surgery for colorectal carcinoma can be performed safely, and in-hospital postoperative mortality is low.
- There is evidence that persons with early stage disease survive longer than do persons whose disease is detected later on.[4] Therefore, the current primary prevention strategy is to detect and remove precancerous polyps or to detect and treat cancer in its early stages.
- Clinical trials of FOBT have demonstrated an increase in the percentage of colorectal cancers detected in earlier stages.[5,6,7] One large randomized study[8] as well as a case control study[9] demonstrated 25% and 33% reductions, respectively, in colorectal cancer mortality with annual use of FOBT.
- Strong evidence exists for the effectiveness of screening with flexible sigmoidoscopy in reducing colorectal cancer mortality. Sigmoidoscopy reduced the risk of death by 59% for cancers within reach of the sigmoidoscope.[10] Screening with short, 35 cm sigmoidoscopes has low sensitivity for the detection of polyps and colorectal cancers, whereas longer, 60 cm sigmoidoscopes can detect 65-75% of polyps and 40-65% of colorectal cancers. A recent cost-effectiveness analysis[11] found that adding flexible sigmoidoscopy at five year intervals to FOBT prevented 2.2 times as many cases of cancer as did FOBT alone, and another study concluded that the interval between screening examinations in asymptomatic, average risk persons can be safely expanded beyond 5 years provided patients have had a carefully perfomed, negative initial colonoscopy.[12]
- A number of studies have demonstrated the effectiveness of FOBT or flexible sigmoidoscopy alone in identifying polyps or colorectal cancer. Compliance with endoscopy, however, is poor. Recommending both FOBT and flexible sigmoidoscopy may improve compliance and increase detection of a lesion missed by one or the other method.

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Comments?

We invite your comments on the proposed recommendation and rationale.

Please send them in writing to Dr. Joann Lindenmayer, either by fax (401-861-5751) or by mail (Rhode Island Department of Health, 3 Capitol Hill, Providence, RI 02908-5097).

References

1. Rhode Island Department of Health. *Cancer Control Rhode Island. Plan for 1990-1992.* Providence, RI: Rhode Island Department of Health, 1989.
2. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services, 2nd ed.* Baltimore: Williams and Wilkins, 1996.
3. Winawer SJ, Shike M. Prevention and control of colorectal cancer. In: Greenwald P, Kramer BS, Weed DL, eds. *Cancer prevention and control.* New York: Marcel Dekker, 1995:537-559.
4. Ries LAG, Miller BA, Hankey BF, et al, eds. SEER cancer statistics review, 1973-1991: tables and graphs. Bethesda: National Cancer Institute, 1994. (NIH Publication no. 94-2789.)
5. Thomas WM, Hardcastle JD. An update on the Nottingham trial of faecal occult blood-screening for colorectal carcinoma. In: Miller AB, Chamberlain J, Day NE, Hakama M, Prorok PC, eds. *Cancer Screening.* Cambridge, United Kingdom: Cambridge University Press, 1991:106-115.
6. Kewenter J, Asztely M, Engaras B, Haglind E, Avanik J, Ahren C. A randomized trial of faecal occult blood testing for early detection of colorectal cancer: results of screening and rescreening of 51325 subjects. In: Miller AB, Chamberlain J, Day NE, Hakama M, Prorok PC, eds. *Cancer Screening.* Cambridge, United Kingdom: Cambridge University Press, 1991:115-25.
7. Kronborg O, Fenger C, Olsen J. Interim report on a randomised trial of screening for colorectal cancer with hemoccult-II. In Miller AB, Chamberlain J, Day NE, Hakama M, Prorok PC, eds. *Cancer Screening.* Cambridge, United Kingdom: Cambridge University Press, 1991:126-30.
8. Mandel JS, Bond JH, Church TR, et al. Reducing mortality from colorectal cancer by screening for fecal occult blood. *N Engl J Med* 1993;328:1365-71.
9. Selby JV, Friedman GD, Quesenberry CP Jr, Weiss NS. Effect of fecal occult blood testing on mortality from colorectal cancer: a case-control study. *Ann Intern Med* 1993;118:1-6.
10. Selby JV, Friedman GD, Quesenberry CP Jr, Weiss NS. A case-control study of screening sigmoidoscopy and mortality from colorectal cancer. *N Engl J Med* 1991;326:653-7.
11. Lieberman, DA. Cost effectiveness model for colon cancer screening. *Gastroenterology* 1995;109:1781-90.
12. Rex DK, Cummings OW, Helper DJ, Nowak TV, et al. Five-year incidence of adenomas after negative colonoscopy in asymptomatic average-risk persons. *Gastroenterology* 99;111:1178-81.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	August 1996	12 Months Ending with August 1996	
	Number	Number	Rates
Live Births	1,303	13,319	14.1*
Deaths	742	9,546	9.6*
Infant Deaths	(4)	(87)	6.3#
Neonatal deaths	(3)	(65)	4.7#
Marriages	905	7,960	8.0*
Divorces	361	3,335	3.4*
Induced Terminations	575	5,534	397.6#
Spontaneous Fetal Deaths	113	1,080	77.6#
Under 20 weeks gestation	(101)	(1,027)	73.8#
20+ weeks gestation	(12)	(53)	3.8#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	February 1996	12 Months Ending with February 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	262	3,261	329.5	4,168.5
Malignant Neoplasms	222	2,560	258.6	6,918.5
Cerebrovascular Diseases	46	637	64.4	567.5
Injuries (Accident/Suicide/Homicide)	13	323	32.6	6,027.0
COPD	22	370	37.4	375.0

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Judicial Diagnosis

Vicarious Liability: Is ERISA Preemption a Successful Defense?

Michele B. Lederberg, JD, MPH

Patient X, who belongs to an HMO, believes that he has been improperly treated. Can he sue the HMO? The answer depends upon a court's interpretation of ERISA.

The manner in which a court interprets the Employee Retirement Income Security Act of 1974 (ERISA) can effect the outcome of a claim against a HMO for the negligence of its affiliated providers.

Some examples:

Providers associated with a New Jersey HMO were alleged to have improperly performed a mammogram and failed to advise an enrollee of abnormalities on the mammogram. The enrollee brought suit against the HMO, alleging negligence of its providers. The court dismissed the malpractice claim against the HMO, holding that such claim is preempted by ERISA. Ricci v.Gooberman, 840 F. Supp. 316 (D.N.J. 1993).

The administrator of a decedent's estate brought suit against a Pennsylvania HMO, alleging the HMO was vicariously liable for the negligence of its primary care physician, whom plaintiff alleged failed to properly diagnose the decedent's condition or refer him to a hospital for treatment, resulting in his death. In response, the HMO alleged that ERISA preempted the administrator's claim. The court, holding that ERISA did not preempt the claim, remanded the case to state court for hearing on the merits. Kearney v. U.S Healthcare, Inc.,859 F. Supp. 182 (E.D. Pa. 1994).

Two similar cases, two different outcomes. The difference does not stem from a legal technicality, but from the differing manner in which courts interpret ERISA.

In 1974, Congress enacted ERISA to provide a uniform body of law that would govern employee benefit plans, i.e. those plans established or maintained by an employer or employee organization for the purpose of providing participants and their beneficiaries with health benefits, among other things. To accomplish this goal, ERISA preempts "any and all state laws" insofar as they *relate* to an employee benefit plan, except those laws governing certain specified areas traditionally regulated by the states, including insurance. When a state law is preempted by ERISA, the only remedies available to a participant of an employee benefit plan are those specifically set forth in ERISA.

Recently, the issue of "ERISA preemption" has received a great deal of publicity. Traditionally, courts refused to impose liability on health insurers for the actions of affiliated providers. More recently, however, courts have appeared willing to impose liability on HMOs and other managed care organizations (collectively referred to as HMOs) for the actions of their providers. As a result, when a participant in an employee benefit plan brings an action against an HMO based upon the negligence of the HMO's providers, the HMO will routinely claim that ERISA preempts any such claims. HMOs assert ERISA preemption because when ERISA preempts state law claims (including statutory and common law actions, such as malpractice) the only remedies available to the enrollee are those specifically set forth in ERISA.

"ERISA" remedies are much more limited than those available under traditional state law claims. The relief available to a participant of an employee benefit plan under ERISA is normally limited to a requirement that the participant's health plan pay for the cost of benefits that were denied. In traditional malpractice claims, a successful plaintiff can recover for lost wages, loss of consortium, pain and suffering.

A split of judicial authority exists on the question of whether ERISA preempts malpractice actions against an HMO. (The First Circuit, which includes Rhode Island, Massachusetts, New Hampshire, Maine and Puerto Rico, has not yet ruled on whether ERISA preempts a claim of vicarious liability against an HMO for the malpractice of its affiliated providers.) Some courts have found that ERISA preempts a malpractice claim based upon vicarious liability. Their rationale: Because the outcome of a malpractice claim for vicarious liability ultimately depends on the relationship

Starting with this issue, Judicial Diagnosis, a commentary on health care laws and regulations, will be a regular feature in Medicine & Health/Rhode Island.

Abbreviations Used:

ERISA Employee Retirement Income Security Act of 1974
HMO Health maintenance organization

between the provider and the administrator of the organization, the inquiry would ultimately focus on a description or explanation of benefits under the plan. Consequently, such claim is related to an employee benefit plan and therefore preempted by ERISA.

A few courts ruling for preemption have considered the policy implications of this decision: One court stated that if it held an HMO liable for the actions of providers, both the HMO and its providers would need to carry liability insurance, thereby resulting in higher costs to the HMO. Those higher costs in turn would trickle down to enrollees. Ricci v. Gooberman, 840 F. Supp. at 318; see also Pomeroy v. Johns Hopkins Medical Services, Inc., 868 F. Supp. 110 (D. Md. 1994).

Courts holding that ERISA does not preempt malpractice actions have frequently found that claims attacking the quality of care do not concern the administration of benefits under the plan. In effect, medical malpractice claims based on treatment do not depend upon a contractual entitlement for health benefits. Rather, such cases require only that the court decide if the services provided deviated from the applicable standard of care. Under such a position, preemption is only triggered where a claim has an effect on the primary administrative function of the employee benefit plan. Furthermore, courts taking this position have stated that the desire to avoid imposing higher costs on enrollees does not justify ERISA preemption. "If costs were determinative, employee [benefit] plans would be exempt from nearly all state tort laws, and they clearly are not. " Haas vs. Group Health Plan, 875 F. Supp. 544, 548 (S.D. Ill. 1994); see also Kearney v. U.S.Healthcare, Inc., 859 F. Supp. at 182.

ERISA does not preempt malpractice claims against a provider for negligence.

The ability of HMOs to prevail on ERISA preemption in response to claims of vicarious liability has important implications for physicians. Although ERISA may, in some circumstances, preempt a plaintiff's claim against an individual's HMO for the malpractice of its providers, ERISA does not preempt malpractice claims against a provider for negligence. Therefore, if a court were to find that ERISA preempts a vicarious liability claim against an HMO, because the plaintiff can only recover the cost of the benefits denied from the HMO, the plaintiff will likely focus on recovery against the individual physician.

If, however, a court finds that ERISA does not preempt a plaintiff's claim against an individual's HMO, a court will likely hear the malpractice claims against the HMO and provider together, thereby diverting some attention from the provider and likely reducing the provider's portion of damages in the event that a court finds both parties are liable. In some cases a plaintiff may even seek damages only from the deeper pocket, the HMO.

Can an enrollee of an employee benefit plan bring suit against an HMO? Unfortunately, because ERISA preemption of vicarious liability claims against an HMO for the liability of its providers remains unresolved, the answer may depend on the jurisdiction where the suit is brought. This split will not be resolved until Congress or the United States Supreme Court takes action. Meanwhile, patients will not know for certain their avenues of recourse. And providers will not know for certain whether the liability of the HMO will shield them from damages.

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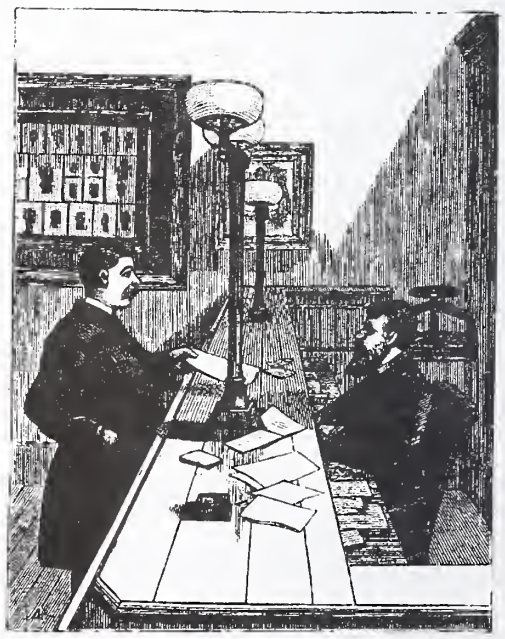

THE RHODE ISLAND MEDICAL JOURNAL

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NUMBER 1

PROVIDENCE, R.I., JANUARY, 1917

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Ninety Years Ago

[February, 1907]

Frank T. Fulton, MD, describes his experiences in the home treatment of patients with pulmonary tuberculosis. The author had seen the salutary results obtained by Dr. Pratt in Boston, using methods believed to arrest if not cure pulmonary consumption. The therapy consisted of absolute bed rest and immobilization of the patient in an outdoor bed protected from the elements only by a tent. Feeding, at times, must be forced. The major encountered problem is that patients with early tuberculosis do not feel as sick as they in truth are; accordingly, they see little purpose in absolute bedrest. In Dr. Fulton's experience with 12 patients, 11 showed marked improvement. All incidentally were from the poorer sections of Providence and no fees had been charged.

Dr. F.T.Rogers discusses the nature and therapies for migraine headache. He notes that physicians confront no symptom more commonly than headache and, "The man who could cure all sorts of headache could have an office hour every other week and spend his vacations in Europe, so profitable would be his practice." He proceeds then to describe what he calls ophthalmic migraine consisting of intense pain in the distribution of the 5th cranial nerve, and intense disturbances in vision and gastric function. It usually begins in childhood or adolescence and is more commonly encountered in females. The author proceeds to discount the presence of "eye strain" as a causative agent. Little is said of definitive therapy although "free emesis or brisk catharsis" may sometimes abort an attack. In some instances, too, the correction of an underlying myopic astigmatism will provide total relief although relief of migraine by correction of some visual defect occurs in only about 10 to 15% of cases.

Professor Philip Hadley of Brown University discusses the origins, symptoms, diagnosis and treatment of rabies. He defines the disease as highly infectious, caused by a protozoan organism. He bases this upon the studies of Negri who has discovered intracellular corpuscle-like bodies in the Purkinge cells of rabies victims. These, he claims, are pathogenic protozoa. The author then discusses the technics by which these Negri bodies may be visualized. He outlines the Pasteur treatment for the disease indicating that of the last 20,000 treatments rendered in Paris, only 0.25% developed the fatal disease.

The Journal lists the names of 14 Rhode Island physicians who had died during the preceding year. Nine were younger than 60 at the time of death.

Fifty Years Ago

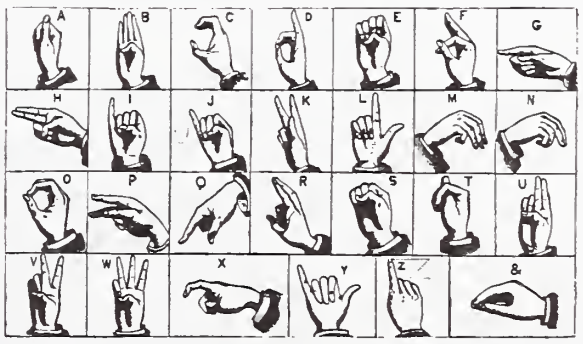
[February, 1947]

Paul C. Cook, MD, discusses Rhode Island's water pollution problem. The author summarizes the types of pollution, the industrial sources for such pollution and the state laws pertaining to pollution. He urges that the groups intimately concerned about this problem, from fishermen to yachtmen to sanitarians, combine their efforts so as to impress their views upon members of the legislature.

Pediatric problems encountered by the general practitioner are considered by Henry E. Utter, MD. Specifically, he touches upon such issues as infant feeding, the parameters of annual physical examination, the tonsil question, respiratory disease, and the treatment of anorexia in an otherwise normal child.

Franchesco Ronchese, MD, outlines the use of topical podophyllin in the treatment of cutaneous vegetations such as condyloma accuminata.

A paper by Edmund Fowler, MD, discusses otosclerosis, progressive deafness and the results of recent research on these problems. The author points out that there are at least ten million Americans suffering from this disorder.



Twenty Five Years Ago

[February, 1972]

A paper by David Freedman, MD, entitled "Medical Care and Our Sick Society," represents the text of his presidential address before the Providence Medical Association. His speech covers such issues as the distinction between the art and the science of medicine, the increasing time which practicing physicians must now devote to the paper work underlying their practice, how physicians spend their free time, the changing nature of medical economics, particularly the rise of HMOs, and the catastrophic social problems [such as automobile-generated morbidity and mortality and drug addiction] which impact upon the dimensions of medical delivery. He ends by warning his readership that their most critical patient, a sick society, is in danger of being killed by overtreatment.

James Yashar, MD, and John Yasher, MD, describe their experiences in the surgical resection of aneurysms of the abdominal aorta. Based upon a series of 137 consecutive cases they advise: "Because of the low operative mortality in elective cases, 5.6%, and the poor prognosis in untreated patients, we strongly advocate elective excision of aneurysms of the abdominal aorta when there is no major medical contraindication."

Announcement

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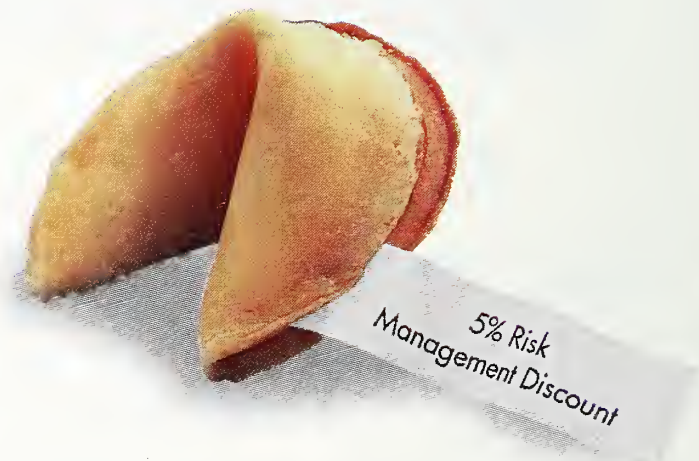

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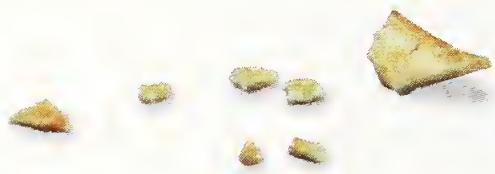

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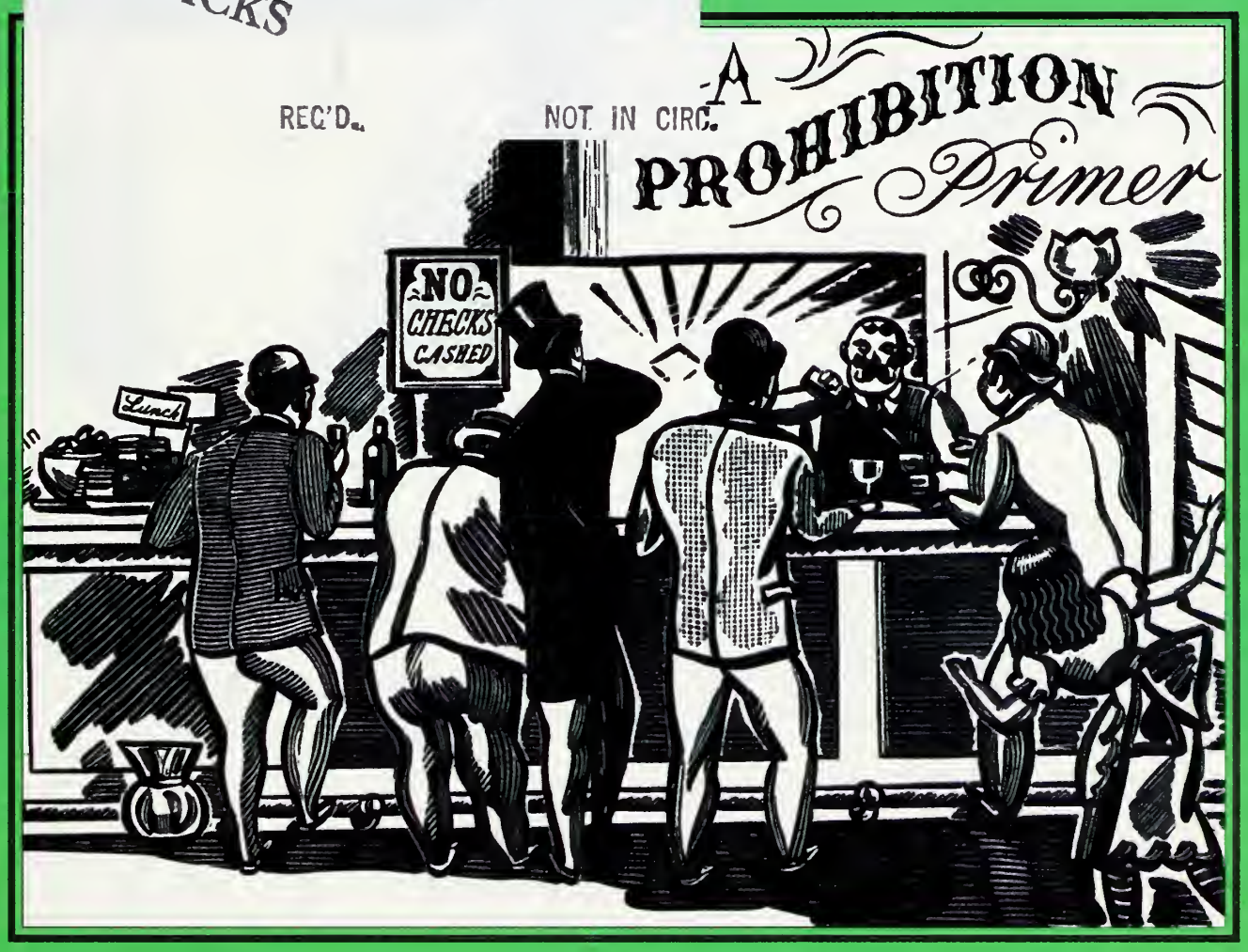

Alcoholism in Rhode Island

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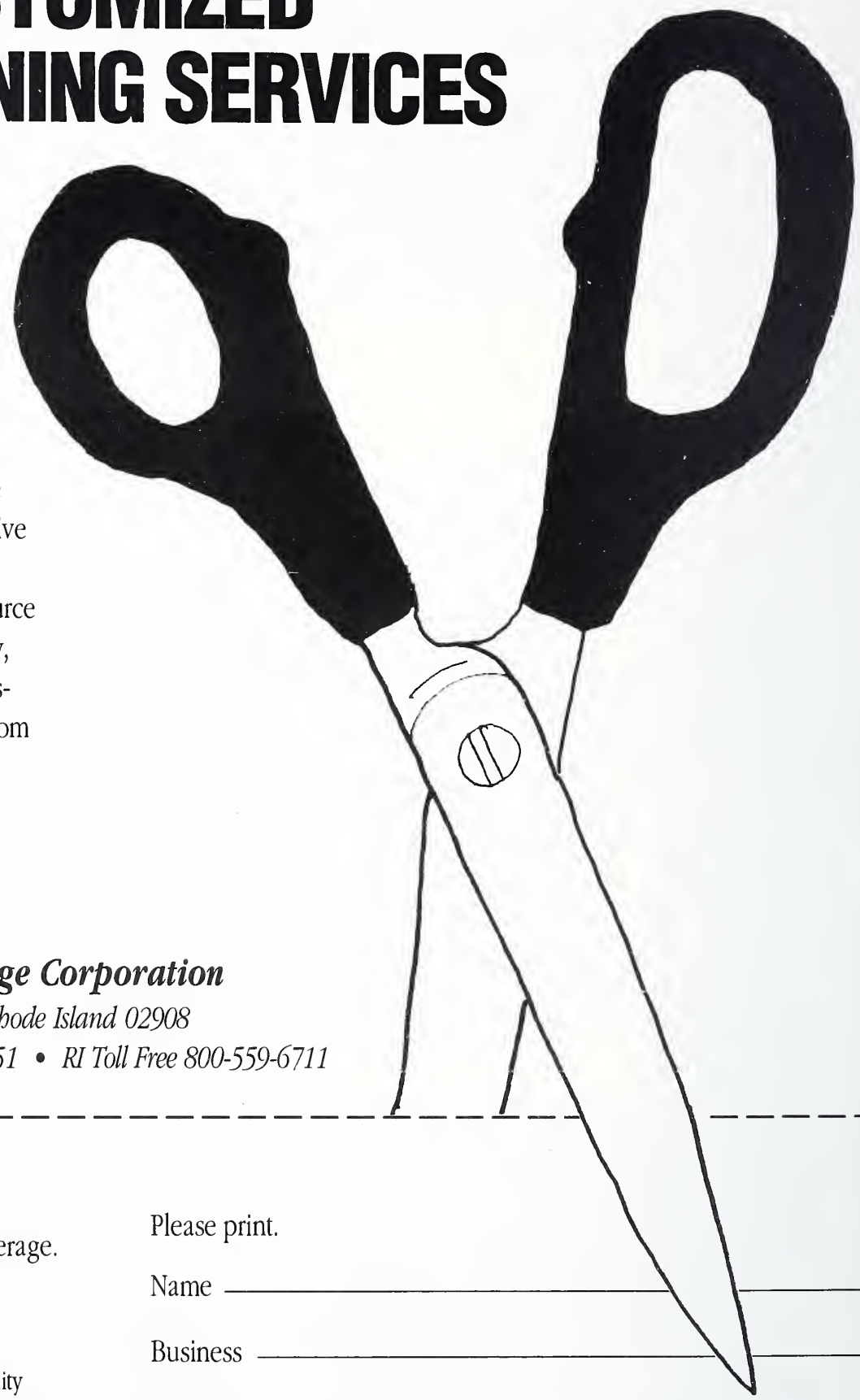

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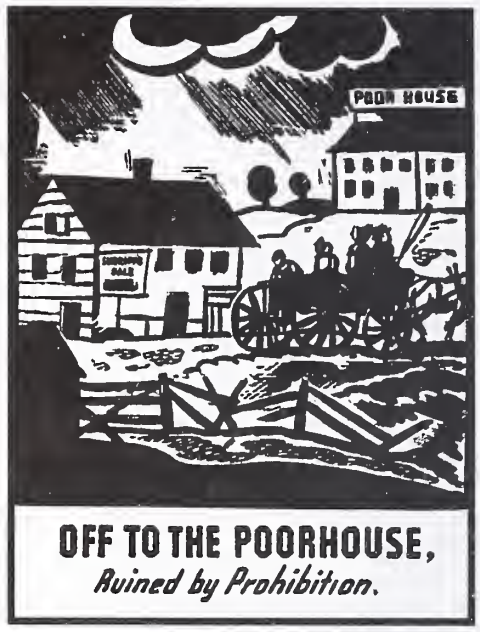
COMMENTARIES

An Imperative for all Practicing Physicians: Screen and Intervene for Alcohol Problems



THE FACULTY ASSOCIATED WITH THE Brown University Center for Alcohol and Addiction studies has prepared this issue, our fourth in the state medical journal, to provide physicians with information that is helpful in the identification and care of patients with drinking problems.

Alcohol abuse and alcoholism may well head the list of underdiagnosed conditions. Prevalence studies report impressive data, even in populations where drinking problems are considered unusual. For example, a study of more than 5,000 primary care patients over the age of sixty (*JAMA*, December 25, 1996) revealed that 15% of the men and 12% of the women regularly drank in excess of the limits recommended by the National Institute of Alcohol Abuse and Alcoholism (>14 drinks/week for men; >7 drinks/week for women). When the CAGE Questionnaire*, the screening tool for alcohol problems, was administered to this population, 9% of men and 3% of women screened positive for alcohol abuse within the preceding three months.

*1) Have you ever felt you should Cut down on your drinking?
2) Have people Annoyed you by criticizing your drinking?
3) Have you ever felt bad or Guilty about drinking?
4) Have you ever taken a drink first thing in the morning, an Eye-opener, to steady your nerves or get rid of a hangover?

Stephen A. Schroeder, MD, President of the Robert Wood Johnson Foundation, suggests eight criteria by which we have been rationing health care services: age, prognosis, coverage, scarcity, budget, price, queue, and hassle. I would add a ninth item—stigma—to head the list of barriers to physicians addressing alcohol problems in patients. Attitude surveys show that while intervention outcome data are positive, physicians have been pessimistic, both about the likelihood that their clinical efforts will influence recovery and the ability of their patients to recover.

Such pessimism is unfounded. A recently completed multicenter study supported by the National Institute on Alcohol Abuse and Alcoholism showed marked improvement —in the order of 60%— from pre- to post-treatment measures. Another study, comparing health care costs for treated and untreated alcoholics over a 4-year post-treatment period, found that the average monthly medical costs of the untreated alcoholics were 24% higher. The cost offsets and social benefits of treatment are important to consider because we are already paying for the medical and social consequences of untreated alcohol abuse and alcoholism. Untreated alcoholics incur general health care costs at least 100% higher than those of nonalcoholics. Aside from the financial ramifications for society, attending to drinking problems appropriately can provide gratification for the physician and much-needed help for patients and their families. In addition, whether physicians take primary responsibility for treatment of their patients' problems or coordinate treatment through specialized services, self-help groups such as Alcoholics Anonymous remain a major potential source of support. Such 12- Step programs are compatible with medical treatment and work best when physicians support them knowledgeably.

There has been progress in encouraging routine attention to alcohol problems in mainstream practice settings. One sign of progress was the Macy Conference, "Training About Alcohol and Substance Abuse for All Primary Care Physicians." After reviewing prevalence and treatment outcome data and current medical practices, the participants, who included the leadership of the primary care medical boards and residency review committees, recommended that the "specialties of Family Practice, Internal Medicine, Pediatrics, and Obstetrics-Gynecology promptly respond to the need to improve the quality of care provided by physicians trained in these specialties to patients with alcohol and other drug problems. These primary care specialties should require all residents to be trained to develop and to demonstrate those skills necessary to prevent, screen for and diagnose alcohol and other drug problems; to provide initial therapeutic interventions for patients with these problems; to refer these patients for additional care when necessary; and to deliver follow-up care for these patients and their families." Furthermore, they mandated that the specialty board examinations and residency review committees strengthen the formal measurement of competencies in this area.

There is clearly a movement in

American medicine toward improving the diagnosis and treatment of alcohol and drug problems. How does this understanding of the place of alcohol and other drug problems in a generalist's practice translate into action? One set of competencies for generalists was presented at the Macy Conference. Do you have these competencies? Have your training and practice experience prepared you to help patients and their families with these problems?

Competency #1 - Screening patients for alcohol and drug use

* Physicians should screen all patients for tobacco, alcohol and other drug use.

Competency #2 - Assessment for problems related to alcohol and drug use

* Persons who screen positive for current tobacco use should be assessed for types of tobacco products used and level of dependence/addiction.
* Persons who drink above established cut-off limits or who have problems related to their alcohol use should be assessed for potential problems related to alcohol use and symptoms of dependence/addiction.
* Persons who screen positive for the use of addictive prescription drugs should be assessed for symptoms of dependence/addiction.
* Persons who screen positive for illicit drugs (five or more times in their lifetime) should be assessed for current level of use, problems related to use, and symptoms of dependence/addiction.

Competency # 3 - Office-based treatment

* Physicians should be able to assist patients who are identified as having potential alcohol and drug disorders using a number of treatment strategies that include brief intervention techniques, counseling and pharmacotherapy.

Competency # 4 - Pharmacotherapy

* Physicians should be skilled in the pharmacological treatment of nicotine, alcohol, and drug dependence. This includes the management of drug withdrawal, post-withdrawal abstinence syndromes, drug maintenance, and co-morbid conditions.

Competency # 5 - Referral to specialized treatment and other community programs

* Physicians should be able to consult with and refer patients to addiction specialists, alcohol and drug treatment programs, and self-help groups.

Competency #6 - Pain management

* Physicians need to be skilled in the management of acute and chronic pain in persons with and without a history of alcohol and drug disorders.

Competency #7 - Clinical indications for drug testing

* Physicians should be able to utilize drug testing for the care of persons adversely affected by alcohol and other drugs. Common indications for testing include testing patients in acute care settings (e.g., emergency departments for patients with severe trauma), confirmation of information provided by patients, and monitoring recovering persons.

Competency #8 - Care of affected family members

* Physicians should be able to recognize and provide counseling services and/or referral for family members or close friends of persons who are adversely affected by alcohol and drug disorders.

Competency #9 - Physician Impairment

* Physicians should be able to recognize and assist colleagues who may have an alcohol or drug problem. Prevention is an essential component of this clinical competency.

– David C. Lewis, MD

David C. Lewis, MD, is Professor of Medicine and Community Health, the Donald G. Millar Professor of Alcohol and Addiction Studies, and Director of the Center for Alcohol and Addiction Studies, at Brown University.

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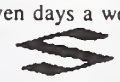

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Trachoma and Immigration

BLINDNESS, LIKE JUSTICE, IS A TWO-edged sword. On the one hand, it may symbolize impartial judgment and a state of serenity closer to one's poetic and prophetic instincts. On the other hand, it may also represent ignorance, removal from the world of reality, the loss of man's most precious sense, and, as with Sampson and Oedipus, divine punishment.

Even in ancient writings there were forms of blindness explainable by forces less intimidating than sacred authority. Chinese manuscripts, dating back thousands of years, described - and even illustrated - a contagious disease of the eyes resulting in redness, swelling and irritation. Egyptian documents, including the Ebers papyri, mention a similar disease. Because of the follicular appearance of the conjunctiva in the chronic phase of this illness, the Greeks called it *trachys,* a word meaning roughness. Pedanius Diascarides, a Greek physician transplanted to Cilicia, impressed with the swelling of the conjunctiva, broadened its name to *trachoma.*

The Romans, always quick to emulate the Greeks in non-military matters, accepted the name of trachoma without change. Alleged victims of the disease included Paul of Tarsus, Cicero and Horace. In the millenia which followed, the disease has also been called Egyptian ophthalmia, epidemic conjunctivitis, military ophthalmia, chronic follicular conjunctivitis and chlamydial conjunctivitis.

Blindness was not unknown to the Scriptural Israelites, but they viewed it either as post-traumatic, the consequences of advanced age [Gen.27:1, Gen.48:10] or the intercession of divine displeasure as when the men of Sodom were struck with blindness [Gen. 19:11]. Indeed, according to the Bible, all blindness was ultimately of celestial origin. When Moses expressed disbelief, the Lord exclaimed: Who but the Lord makes man seeing or blind? [Exodus 4:11.] Yet the Bible makes no mention of anything resembling trachoma despite its endemicity in the Middle East throughout the biblical era.

Crusaders returning from the Holy Lands brought this highly communicable conjunctivitis to central and northern Europe, regions which had not previously experienced it. Francis of Assisi, upon his return from the Holy Land in 1226 was said to be blind, possibly from trachoma. However the major element in the spread of trachoma throughout eastern Europe and Russia was the troops of Napoleon's army, previously stationed in Egypt and then transferred to central and eastern Europe. Over 30,000 French soldiers, participants in the Egyptian campaign, were themselves victims of trachoma, now called military ophthalmia.

The first experimental evidence that trachoma was caused by an infectious agent was provided in 1907 when the disease was transmitted to primates and the characteristic cytoplasmic inclusion bodies were seen in both donor and host. Agents of this microbial group, first called *Bedsonia* and then *Chlamydia* [Greek, *chlamys,* to cloak] were serially transmitted to embryonated eggs in 1957 and, *in vitro,* through tissue culture in 1965. Serologically discrete members of the Chlamydia family are the causative agents of psittacosis, chronic urethritis, cervicitis and salpingitis; and occasionally, an assymmetric polyarthritis and uveitis. In many southern hemisphere nations, the Chlamydia are the dominant agents of sexually transmitted disease.

The trachoma agent is readily transmitted from person to person by soiled hands, by flies or by articles of clothing contaminated with its mucopurulent discharge. The earliest ocular symptoms include a bilateral watering, a subjective sense of foreign bodies, a feeling of conjunctival roughness, edema, lid ptosis and entropion, follicular inflammation [representing lymphoid elements], punctate keratitis, corneal ulceration and scarring, and defective tear production. Superimposed bacterial infection hastens the scarring, vascularization and ensuing blindness.

In the early decades of the 20th Century, when large numbers of eastern and southern Europeans sought entrance to this country, trachoma was declared by the United States Immigration & Naturalization Service to be one of a small number of diseases the presence of which constituted reason for exclusion. Immigrants were aware of this and there are stories of shipboard children being needlessly blindfolded for days prior to their arrival in New York harbor to prevent any redness of their eyes which might then deny the family admission to the Golden Land. Immigrants have described the terrifying experience when they entered the vast processing rooms on Ellis Island. At the top of the great stairs a group of uniformed inspecting officers awaited them. Each immigrant was carefully observed for evidence of frank disease, frailty or mental instability; and the eyes of each prospective immigrant were closely examined for the telltale granulations that bespoke trachoma. If such was found, a chalk mark "E" was written on the immigrant's jacket. [Many code letters were used. For example, "K" signified a hernia, "G" for goiter and "X" stood for mental derangement.] These ominous chalk marks meant certain rejection and return to Europe. In the decades around

the turn of this century, trachoma became the leading cause for deportation. Despite these measures trachoma was widespread in the immigrant populations of east coast American cities. A careful survey of New York City school children, in 1905, revealed that 4.2% had severe trachoma and 5.8% had mild trachoma.

Acute trachoma, in recent decades, has become exceedingly rare within the United States. One of Providence's leading ophthalmologists states that he has not seen an active case in over thirty years [although some recent Asian immigrants to the state do have corneal scarring suggesting prior trachomatous infection.]

Despite the ease of curative treatment, trachoma persists today as the leading cause of blindness in the world, accounting for some 15 to 20 million instances of sightlessness. The disease, affecting some 700 million humans, is most prevalent in rural sub-Saharan Africa, particularly in the "trachoma belt" involving Sudan, Egypt and lands to the east where about 60% of the population are affected. About 65% of aboriginal Australians native to the northern territories are infected with *C. trachomatis* and 7% blinded by it.

Trachoma is an inevitable accompaniment of poverty, crowded living conditions, inadequate water supply and poor personal hygiene. And lest it be thought of only as a disease of the distant third world, it is fitting to remember that many Italians, Russians, Jews and Greeks attempting to emigrate to these shores earlier this century, were victims of the disease.

– Stanley M. Aronson, MD

Bubonic Plague in a Tuscany Village

THE BUBONIC PLAGUE WAS BROUGHT to the southern Italian ports in 1346 having travelled the established trade routes from China through India, the Middle East and the Levant. During the succeeding three years the pestilence spread throughout Europe in a major epidemic now called the Black Death. The European plague persisted as an endemic contagion during the succeeding four centuries, punctuated occasionally by superimposed epidemics.

The plague languished in Italy but would occasionally resume, as in 1630, with devastating results. The great cities of the Italian north - Milan, Florence, Venice, Genoa - had developed sophisticated municipal bureaucracies, becoming thriving centers of culture and international commerce. Their Health Ministries, called the Magistracies, were the most advanced in 17th Century Europe. Their public health regulations were regarded as judicious and farsighted and their vital statistics records were consistently maintained. Many of these archives, including the prolific correspondence between the outlying villages and the central Health Magistracies are still available to scholars. The Italian historian, Carlo M. Cipolla, has reviewed the records of the tiny village of Monte Lupo, located some 40 kilometers west of Florence, to ascertain the effects of this 1630 plague upon a hillside community of some 150 families.[1]

To most citizens of Monte Lupo, the return of the plague was frightening but not unexpected. Most perceived it as a recurrent, divinely inspired verdict derived, in the words of one cleric, "from the treasury of His wrath." The more literate in the Florentine community, including the senior clergy and the nobility, decried attitudes of passive submission in the face of epidemics. Because of the differing perceptions as to the fundamental cause of the pestilence, much conflict inevitably arose between the secular leadership and senior ecclesiastics on one side, and the local clergy on the other. The more educated asserted that meaningful interventions might be undertaken, particularly quarantine. The local clergy, however, obstinately declared that earnest, fervent prayer, public mortification and communal atonement were the only valid responses to the plague. Accordingly, the resident clergy demanded mass meetings of the populace. The senior clergy, contending that mass gatherings would only hasten the spread of the "miasma", pressed for strict observance of the civil quarantine laws. The local clergy had further reasons for actively resisting the imposition of public health regulations since the Magistracies frequently exercised the right of eminent domain in taking over monastery property for the housing of plague victims.

The plague struck Monte Lupo in late August, 1630; and, despite restraining orders from both civil and ecclesiastic authorities, mainly from Florence to the east, the local priest went ahead with massive religious processions as his pious reaction to the plague.

Monte Lupo, in many ways, was a microcosm of the 17th Century conflict between those who believed that all earthly events were in the sole hands of a divine authority and those who contended that if God allowed man to clothe himself when it snowed, that God would also expect man to undertake reasonable steps to counteract the onslaught of pestilence. Following the many street processionals, but only after the plague had abated, trials were conducted and much punishment was meted out to those who disobeyed the health rules.

The 1630 Health Magistracy instructions [*Iztruziones*] illustrate the clarity and rational thinking of those who devised these extremely detailed and lengthy regulations. A few extracts follow:

1. Assemblies and gatherings of people in times of contagion have the worst of consequences, and are to be banned.
2. Those dead of suspected plague are not to be buried in the churches but in the countryside far from the high roads, and a hundred armslengths from the houses, and in a grave at least three armslengths deep.
3. As soon as the news arrives, the Justice shall give orders that the sick man be carried to the pesthouse. . . and the other occupants of the house must then not leave the house . . . under pain of their lives and confiscation of their goods. The doors of these houses shall be boarded up.
4. The quarantined shall be supplied with the necessary victuals from some innkeeper nearby to the amount of eight *soldi* a day per head.
5. The quarantine must be maintained at least 22 days from the day that the last sick person had died or recovered. The said houses must then be perfumed and purified by burning brushwood and making smoke with sulphur, the walls whitewashed with alkaline solution, and linens either laundered or burned.
6. Those who are healthy but house-confined shall take, each morning, some Venice treacle and oil themselves against the poison. In the morning they shall also eat nuts, figs and rue. The sick shall take hot chick-pea or goat's rue and shall cover themselves so as to sweat. When swellings [buboes] appear, oil them with oil of white lilies or camomile or flax seeds. Small carbuncles are to be treated with pomegranate juice and seeds.

In retrospect, the public health rules established by the leadership of Tuscany reveal the beginnings of a rational approach to the imminent perils of contagion. The actions of the local clergy, on the other hand, by obstinately insisting upon the gathering of the townspeople in religious processions during the height of an epidemic and resisting the opening of the lazarettos [pesthouses] were clearly counterproductive.

The archives of Monte Lupo, immune to the logic of the 20th Century, show, however, that implementation of these rules had terrifying and unforeseen effects: Within days of the activation of civil quarantine there was a total breakdown of the social life of Monte Lupo; entire households were quarantined resulting in inevitable fragmentation of families; there was suppression of all intercity commerce and intracity marketing resulting in rampant unemployment [except for grave-digging] and widespread abandonment of productive farmland. Many villagers necessarily turned to looting. All schooling and apprenticeships ceased. Family possessions were needlessly burned. Many children were orphaned, but Monte Lupo had no orphanages. Marriages and other social contracts were delayed or abandoned. And most tragic of all, the mortality rates from plague in Monte Lupo were not much different than those experienced by communities where no such stringent rules had been implemented.

Since the bubonic form of the plague is transmitted via the infected rat's flea biting a human and not by mere human contact, quarantine will have no effect upon the transmission of the organism. All of these "rational" interventions thus served only to paralyze totally an already stricken community. It would be decades before Monte Lupo returned to its former state.

When historians study past events, they seek to distinguish the important historical currents from the trivial eddies of daily life. History, properly evaluated therefore, becomes an analysis of the broad, intertwining social forces rather than the trifling circumstances which occupy the daily lives of people.

These broad strokes, the chapter headings, which portray the chronicle of man are critically important; but the perspective of many histories is so lofty that by failing to provide the texture, the aroma, the minutiae of daily life they inevitably fail to appreciate the parochial effects of such interventions as the quarantine law. The street-level citizens who are in the midst of awesome historic upheaval see only the fluctuating price of bread or the unrepaired hole in their boot.

A cursory history of preventive medicine in the 17th century would likely applaud the development of public health measures but might not record the many unintended consequences of these allegedly laudable regulations. Good history certainly emphasizes the grand sweep of major events in the major urban centers; but meaningful history will not ignore the petty happenings in the anonymous villages. An accurate portrayal of history will tell the story in human as well as epic dimensions.

– Stanley M. Aronson, MD

References

1. Cipolla CM. *Faith, Reason and the Plague in the 17th Century in Tuscany.* Ithaca, NY: Cornell University Press, 1979.

A Conference on Literature and Medicine

AT FIRST GLANCE THERE IS LITTLE COMmon ground between literature and medicine. Physicians, deploring the inexactitudes of the humanities, seek to cure solely by scientific criteria; writers struggle to fashion their works from insubstantial remembrances, dreams and vagrant feelings. Yet words are indispensable to both, making the intersection of literature and medicine something more than a random encounter of two respected disciplines. Great writers, gazing into the world of suffering, endow their writings with discerning words and portray disease more vividly than the best of objective clinical descriptions. It is from such literary sources that gifted physicians have come to perceive those domains of humanity which are indifferent to the constraints of molecular biology.

Physicians and writers share both a burden and a mission. The shared burden is the obligation to acknowledge things, not as they should be, but as they are: faithfully to define life's frailties, contradictions and defeats. But beyond the transcribing of reality, the task for each calling is to engender hope, purpose and understanding to those who seek enlightenment or restoration. Writers, attempting to give meaning to chaos, must struggle beyond the mere recording of pain's dimensions. Similarly, physicians must do more than document the path of an illness: physicians must skillfully intervene; they must udertake therapies and through their humanity bring forth a healing which goes beyond curing.

About two decades ago a great scholar of English literature was brought to Brown University as Dean of the College. For a decade, Harriet W. Sheridan provided Brown with distinguished teaching and academic leadership. During those productive years, an enduring friendship blossomed between Dean Sheridan and Lynn C. Epstein, MD, Associate Dean of Medicine at Brown. From this intellectual kinship arose an undergraduate course exploring the complex interdependency of literature and medicine. Participating students, including many from the medical school, explored and analyzed the literary works of physician-writers such as Rabelais, Keats, Anton Chekhov, Somerset Maugham, Oliver Wendell Holmes, William Carlos Williams, even Conan Doyle. They discussed the physician as fictional hero and they read those deathless works of literature, such as Mann's *Magic Mountain*, which portrayed the effects of illness upon the lives of men and women.

The course was enormously successful and enriched communication between the faculties of medicine and the humanities. Some of the medical students who participated have since contributed essays and poetry to this state medical journal.

Ten years ago Harriet Sheridan began a personal encounter with cancer, a conflict that shaped the activities of the last five years of her life. She struggled to come to terms with her illness; and, as with all who confront an implacable disease, she asked, "Why me?" But as a scholar, wise in the remorseless ways of the world, she added, "Why not me?" She determined to help others better understand the experience of illness. Through her teaching and by her personal example, she demonstrated the importance of allowing each individual confronted with serious illness to shape her own course. Stepping down as dean, she explored medical education, and clearly defined a crucial role for physicians: to understand and to follow patients' priorities. Harriet Sheridan died on September 8, 1992, leaving her family, her friends, and Brown University diminished.

Harriet Sheridan's legacy is found in her writings, in the hearts and minds of her family, and in the many friends, colleagues and students she influenced. In her memory, Dean Lynn Epstein created the Harriet W. Sheridan Literature and Medicine Lectureship and Forum in the Brown University School of Medicine, the first of its kind in a medical school. Begun in April 1993, it is now fully endowed, free and open to the public. The annual program has brought together distinguished physician-authors and literary scholars, to highlight the affinity between medicine and literature.

This year, in honor of the fifth anniversary of the program, and with a gift from the Rhode Island Committee for the Humanities, the special weekend symposium will bring together a wealth of talent. The 1997 symposium will be held in the Salomon auditorium at Brown on April 4-6, 1997. The program will include talks, interactive discussions, conversations with authors, and exhibits. On Friday, April 4, at 4 pm, Dr. Rita Charon will open the program discussing "The Changing Role of Literature and Medicine," followed by a reception. On April 5 the morning sessions will be devoted to Physicians' Stories, including Richard Selzer, MD ("The Surgeon as Writer") and Susan Mates MD ("What We Talk About When We Talk About Medicine"). The afternoon sessions will feature Stories of Mental Illness, with Peter Kramer, MD ("Listening to Prozac"), Anne Hudson Jones, PhD ("Patient Stories of Mental Illness") and a panel discussion/dramatic reading on Alzheimer's. On April 6 the morning session will feature Stories of Patients and Families, with Suzanne Poirier, PhD ("Family Caregiving and the Practice of Storytelling") and John Stone, MD ("My Private Rainbow: A Life in Writing"). The program will close with a speakers' roundtable discussion.

For detailed information, please call either Claudia Cockerill or Marilyn Thomson at 863-1140, or scan the Web, at http://www.brown.edu/Departments/English/courses/Epstein/sympo.htm.

Patterns of Alcohol Use and Misuse Among Adults in Rhode Island

David F. Duncan, DrPH, CAS

AMERICA IS A NATION OF ALCOHOL drinkers. More than four out of every five Americans aged twelve and older have used alcohol at some time in their lives; approximately half are current drinkers.[1] One out of twenty report having drunk more than five drinks at a setting on at least one occasion in the past year, which has been characterized either as "binge drinking" or "heavy drinking."

Estimates from the Epidemiologic Catchment Area Study indicate that six million American adults (3.3% of the adult population) currently meet the diagnostic criteria for alcohol abuse or alcohol dependence while an additional nineteen million (10.5%) who had met the criteria in the past are now symptom-free.[2] In other words, about one out of every twenty current drinkers is an alcohol abuser or alcohol dependent.

We have many statistics about the United States as a whole. The National Household Survey on Drug Abuse, as well as surveys conducted by the National Center for Health statistics, provide us with national data on a regular basis. When it comes to our own state, however, the number of Rhode Island residents included in any of these national samples is too small to permit the calculation of reliable rates of use or abuse. In 1985, the Brown University Center for Alcohol and Addiction Studies, employing synthetic estimation methods to the national survey data, estimated that there were 71,000 adult alcoholics in Rhode Island, only 11% of whom were receiving treatment.

With funding from the federal Center for Substance Abuse Treatment, the state Department of Health is conducting a family of studies, the Unified Needs Assessment Project. This project will combine the results of adult and adolescent telephone surveys with special surveys of high-risk and hard-to-reach populations in order to estimate the need for substance abuse treatment services in Rhode Island. For the first time it will give us a clear picture of the extent and patterns of use and abuse of alcohol, tobacco and other drugs in our state. Results should be available in the fall of 1997.

Abbreviations Used:

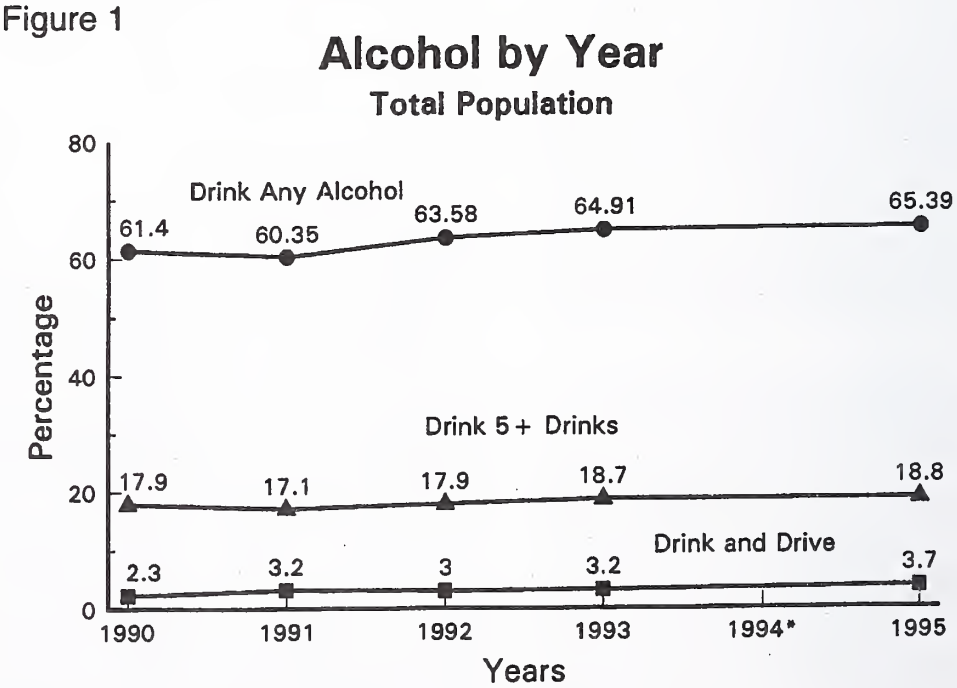
BRFSS	Behavioral Risk Factor Surveillance System
RIBRFS	Rhode Island Behavioral Risk Factor Surveillance

In the interim, our best source of data on the epidemiology of alcohol use and abuse in Rhode Island comes from the Behavioral Risk Factor Surveillance System (BRFSS), which is a continuing telephone survey of a randomly selected sample of Rhode Island residents aged 18 and older. The survey examines a number of health risk behaviors including alcohol usage. The questionnaire is revised annually and data collected each month is cumulated into an annual analysis and report. A minimum of 150 interviews is conducted each month and at least 1,800 per year.

The statistic from the BRFSS is that 65.4 % of Rhode Island adults report having drunk alcohol in the past month, compared to the 50% figure given above for all American adults. The average Rhode Island adult consumes 18.4 standard drinks of alcohol per month — with a standard drink defined as one can or bottle of beer, one cocktail, or one shot of liquor. While there has been a decrease in total alcohol consumption in Rhode Island, the number of persons reporting drinking has increased over the past five years: more people are drinking less alcohol than in the recent past.

Interestingly, when amount of alcohol consumed was cross-tabulated with self-rated health, no significant association between the two was found.

Figure 1



* Data not collected in 1994.

Self-reported alcohol consumption also showed no significant relationship with self-reporting of number of days of poor health, either physical, mental or both combined. While it is well established that excessive alcohol use can have serious, deleterious effects on health, the levels of alcohol use which characterize much of the population are not high enough to produce ill effects.

The RIBRFS data permit analysis of chronic drinking. Unlike chronic alcoholism, chronic drinking is simply a regular behavior which persists over time. For the RIBRFS a chronic drinker is anyone who reports that, on average, they consume two or more drinks per day, i.e., sixty or more drinks per month.

The 1995 results showed that 5.3% of adult Rhode Islanders were chronic drinkers. Men were much more likely to be chronic drinkers than were women, with 9.8% of men and only 1.2% of women reporting drinking an average of two or more drinks per day.

Rates of chronic drinking also varied over a number of other demographic characteristics. For instance, chronic drinking was more common among whites (5.6%) than non-whites (2.9%). Among non-whites, there was a small difference between African-Americans (3.1%) and Hispanics (2.7%). Chronic drinking showed a slight increase with higher levels of education. Occupationally, the highest rates were found among adult students (15.2%) and those unemployed for less than one year (8.7%); the lowest rates, among homemakers (1.4%) and those who had been unemployed for more than one year (1.8%). Similar rates were found for those employed (5.0%) and those who were retired (4.7%), with a little lower rate for the self-employed (3.4%).

With regard to marital status, there were higher rates among those never-married (8.0%) and currently separated (7.0%) than among those married (4.9%) or divorced (4.9%), with the lowest rates among those widowed (1.9%). These rates are probably confounded to some degree with age, since chronic drinking is more common in people aged 18-24 (8.1%) than older people (4.5 - 5.1%).

While there has been a decrease of total alcohol consumption in Rhode Island, the number of persons reported drinking has increased over the past five years.

The RIBRFS does not apply diagnostic criteria for alcohol abuse or alcohol dependence, so it cannot describe patterns of alcoholism in Rhode Island. It can, though, describe a pattern of drinking which is often problematic - "binge drinking." While the term "binge" conjures images of a Lost Weekend-type of drunkenness, the RIBRFS defines it as consuming more than five drinks on one occcasion. In 1995, nearly one out of five Rhode Islanders (18.7%) engaged in binge drinking at least once, and 4.3% did so five or more times, during the month before being interviewed. As shown in Figure 1, rates of binge drinking appear to be fairly stable over recent years.

Men are more likely to binge drink than women (29.4% did so at least once and 8.2% five or more times per month). Only 9.2% of women had engaged in binge drinking during the month before; less than 1% had done so five or more times in the month. The rate of bingeing was 19.4% among whites, 15.1% among Hispanics, and 13.6% among African-Americans.

Rates of bingeing are highest among those who have never married (33.6%) and those who are separated (22.1%). Rates are similar for the married (14.7%) and the divorced (14.2%), and lowest for widows/ers (3.9%).

Binge drinking appears to have no association with education, except for a low rate (13.2%) among those with only an elementary education. Higher rates of bingeing (21.0% in both cases) are found among those with annual incomes less than $10,000 or greater than $35,000. Adult students (38.2%) have highest rates of bingeing; homemakers (5.5%) and the retired (5.8%) have the lowest.

Another problematic alcohol-related behavior covered by the RIBRFS is driving while intoxicated. A disturbing 3.6% of adults reported driving during the past month after having had "too much to drink." Figure 1 does not reveal any clear trend in the preva-

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lence of drinking and driving, but the rate for1995 is higher than for the previous four years. Nearly three times as many men (5.6%) as women (1.9%) self-reported drinking and driving. For males, the highest rate of drinking and driving was reported by 25 to 34 year olds (8.7%), with rates around 6% for all other ages under 55; for 55-64 year old males the rate was 3.1%; for those 65 and older it was 1.4%. Driving while intoxicated was most common in women aged 18- 24 (8.4%), declining to 2.4% in those 25-34, 2.0% in those 35-44, and below 1% for women 45 and over.

Drinking and driving is self-reported by 7.0% of African- Americans, 3.8% of whites, and 2.1% of Hispanics. It is most common among those who have never married (8.5%) and nearly nonexistent among the widowed. Rates are highest among those with incomes greater than $35,000 (5.0%), around 2% at other income levels, except $10,000 to 14,999 (3.2%).

Persons who have been unemployed for less than one year have the highest rate of drinking and driving (7.6%) with the next highest rate among the employed (5.5%). Uniformly low rates are reported for students (1.9%), self-employed (1.7%), those unemployed for more than a year (1.7%), and retirees (0.9%). No homemakers reported driving while intoxicated.

Finally, the data permit some generalizations about patterns of drinking in Rhode Island. First, men tend to drink more, and more problematically, than do women. Whites drink more than non-whites on average. The young and those who have never married are likely to drink more and more often than older and married persons. These patterns are essentially the same as those which can be generalized from national data.

References

1. Gfroerer J. *Preliminary Estimates from the 1993 National Household Survey on Drug Abuse.* (Advance Report No. 7). Rockville, MD: Office of Applied Studies, Substance Abuse and Mental Health Services Administration, 1994.
2. Helzer, JE, Burnam A, McEvoy, LT. Alcohol abuse and dependence. In: L. N. Robins, and D. A. Regier (Eds.), *Psychiatric Disorders in America.* New York: Free Press,1991.

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Medical Consequences of Alcoholism

Michael D. Stein, MD

THE SPECTRUM OF DISEASE RELATED to alcohol is broad. Health care providers must actively consider alcohol use when taking patient histories, doing physical examinations and considering differential diagnoses in order to identify at-risk alcohol users before serious complications arise. Clinicians should be aware that the prevalence of alcohol abuse among persons who seek medical care is at least double that in the general population.

Population studies have shown that heavy drinkers have an increased risk of death from cirrhosis, motor vehicle accidents, suicide, homicide, particular malignancies and cerebrovascular disease.[1] The importance of controlling for cigarette smoking, a strong correlate of alcohol use and a predictor of death from several of these causes, is well known. Nonetheless, the risk of death among heavy drinkers is at least 50% higher than the risk among light drinkers, and this risk is increased more for women than men. Alcoholic men who achieve stable abstinence return to age-, sex- and race-matched mortality experience.[2]

There is generally a direct relationship between alcohol consumption level, or duration of use, and clinical problems. It has recently been noted that women have higher blood levels than men, given an equivalent dose of alcohol, most likely due to smaller size and less first pass gastric metabolism.[3] Women who drink consume less alcohol on average than men who drink, and as a group have fewer alcohol-related problems and dependence symptoms than men. However, women who drink comparable amounts, particularly at high levels of intake, are more likely to be impaired than men, both immediately and over time.[4] Indeed, for certain diseases such as cirrhosis, women develop symptoms after fewer years of alcohol consumption and die from liver failure at a younger age, a phenomenon termed "telescoping."

Chronic, heavy alcohol use is associated with protean medical complications. A wide range of patient symptoms (Table 1), physical findings (Table 2), and laboratory abnormalities (Table 3) have been described. Many of the disorders described below can be halted or reversed by cessation of alcohol intake. First, I will describe disorders that can affect persons who do not have alcohol abuse but which are so commonly associated with problem drinking that clinicians should consider a potential connection. Second, I will concentrate on clinical findings caused by alcohol itself.

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
DSM	Diagnostic and Statistical Manual
HIV	Human immunodeficiency virus

Conditions Associated with Alcohol Abuse

For clinicians, some associated conditions should raise the possibility of alcohol abuse in patients. These include mental health disorders (particularly depression), other drug abuse, sexual dysfunction, reproductive problems, and eating disorders. All are prevalent among problem drinkers and may be viewed as consequences or at least concomitants of heavy drinking.

Many epidemiologic studies have found that nearly all psychiatric diagnoses are more prevalent in alcoholics than in nonalcoholics. Major depression is the most common psychiatric comorbidity, with 30-50% of alcoholics meeting DSM criteria for major depression. The relationship between alcoholism and major anxiety disorder has been repeatedly documented but it remains unclear if the anxiety conditions are lifelong disorders or temporary conditions related to intoxication and withdrawal. Many symptoms of depression (sleep disturbance, loss of appetite, irritability) are also reported during heavy alcohol use and withdrawal.

Whether cause or consequence of drinking, depression and anxiety should be screened for in primary care settings, along with alcohol abuse. Nonetheless, alcoholic men and women have markedly higher risk of suicide than non-alcoholic persons.

Table 1

Medical Signs and Symptoms of Alcohol Use

Nausea	Abdominal Pain
Vomiting	Weight Loss
Anorexia	Muscle Weakness
Diarrhea	Dizziness
Tremor	Confusion
Myalgia	Headache

Table 2

Physical Findings Among Heavy Alcohol Users

Spider Angiomata	Tachycardia
Palmar Erythema	Hypertension
Gynecomastia	Dupuytren's Contracture
Parotid Gland Enlargement	Proximal Myopathy
Polyneuropathy	Periorbital Edema
Hepatomegaly	Jaundice
Splenomegaly	Heme-positive stool

Table 3

Laboratory Abnormalities Due to Alcohol Abuse

Hyponatremia	Thrombocytopenia
Hypokalemia	Hypophosphatemia
Hypomagnesemia	Transaminitis
Hyperamylasemia	Anemia
Hyperbilirubinemia	Leukopenia
Prolonged Prothrombin Time	

Clinicians may medicate a patient's depression or anxiety but, missing the signs of alcohol abuse, overprescribe anti-anxiety drugs and antidepressants.[5] Alcohol abuse compounds the danger of prescription drug use, particularly in the elderly. The coexistence of alcoholism and other drug addiction is also common.

Heavy drinking not uncommonly follows reproductive problems. Infertility, miscarriage, and premature delivery are all associated with alcohol use disorders, suggesting that impairment of reproductive potential puts women at risk. The association of problem drinking and sexual dysfunction suggests that women may use alcohol to cope with sexual dissatisfaction or alternatively, the dysfunction may be a consequence of drinking. Heavy alcohol use is also associated with impotence. In either case, women and men who are drinking heavily are less likely to use contraceptives and more likely to engage in unsafe sexual behaviors. The association between alcohol abuse and high risk behaviors for acquiring AIDS has more recently been demonstrated by the finding of a substantial prevalence of HIV infection among clients of alcohol treatment programs.[6]

Finally, cross-sectional studies of women with eating disorders including anorexia nervosa and bulimia have documented high prevalences of alcohol abuse. An estimated 25% of women being treated for eating disorders abuse alcohol or use it in excess. Conversely, women with substance abuse disorders report higher rates of eating disorders.

Medical Conditions

Gastrointestinal

The most common complaints related to alcohol are gastrointestinal: pain, bloating, nausea and vomiting. Alcohol slows gastric emptying, stimulates gastric secretions, and injures gastric mucosa. While symptoms often subside with abstinence, for even moderate drinkers the risk of gastritis and ulcers is not trivial. Heavy chronic drinking is associated with acute and chronic pancreatitis which must be differentiated from gastritis and ulcer for those patients with abdominal symptoms.

Right upper quadrant pain is a frequent presentation of liver disease and often occurs in persons consuming modest quantities of alcohol (20-40 grams per day). It may signify fatty liver (the most common histologic abnormality on biopsy), hepatitis, cholestasis or portal hypertension. Alcoholic hepatitis may be asymptomatic, or florid and life-threatening, usually developing over weeks with vomiting, weight loss and sometimes jaundice. In mild cases the course is benign, but a significant number of persons worsen despite abstinence and nutritional care. The clinical, biochemical and histologic consequences of hepatic injury may occur separately or in combination, although there is a poor correlation between clinical syndromes and pathologic abnormalities.

Early diagnosis of alcohol-related liver complications is important since both fatty liver and alcohol hepatitis are reversible while cirrhosis is not. Cirrhosis occurs in 10-20% of chronic heavy alcohol users (120-180 grams per day for more than 15 years), but is discovered in only 25% of patients antemortem. Women may have a greater susceptibility to cirrhosis. Nonalcoholic-related liver disease must be considered even among heavy alcohol users.

Cardiovascular

Chronic alcohol abuse can be associated with a variety of cardiovascular disorders including hypertension, stroke, heart failure and sudden death. Alcoholic cardiomyopathy is often subclinical. Clinical decompensation typically occurs in person who have ingested at least 80 grams per day for at least 10 years. Early diagnosis of alcoholic cardiomyopathy responds to the cessation of alcohol intake. Cardiomyopathy and myopathy are more common in female alcoholics than men. The threshold dose for the development of cardiomyopathy is considerably lower in women and the slope of decline in ejection fractions is steeper in women, indicating that women are more sensitive than men to the toxic effects of alcohol on striated muscle.[7]

Cardiac arrhythmias, mostly atrial, can occur during intoxication, withdrawal, and even moderate intake in persons without cardiomyopathy.[8] Atrial fibrillation is the most common presenting rhythm, and electrolyte levels are usually normal. Cardioversion is often required to return patients to sinus rhythm. An increased risk of sudden cardiac death in persons who abuse alcohol but do not have known heart disease has been noted in cohort studies and case control series.

Epidemiologic studies have also indicated a positive association between the amount of alcohol consumed and cerebral vascular accidents including subarachnoid hemorrhage and stroke. This increased risk may be mediated via alcohol-induced hypertension. Primary care providers should consider alcohol consumption as a potential cause of hypertension, since 5-10% of hypertensive cases are thought to be due to alcohol intake. Certainly, response to antihypertensive agents is lessened by active alcohol use. For heavy drinkers (6 or more drinks per day) the prevalence of hypertension is double that of abstinent individuals.

Hematologic

The hematologic disorders related to alcohol result from the direct effects of ethanol, those resulting from secondary nutritional deficiencies, and those due to hepatic disease. A spectrum of hematologic problems involv-

ing red cells, white cells, platelets and other hemostatic factors has been described, since the production of erythrocytes, white cells and platelets can all be suppressed by alcohol. In severe alcoholism, anemia with macrocytosis is frequent. In alcohol users without marked liver disease, folate deficiency, reticulocytosis and macrocytosis predominate, often without anemia. Up to 75% of heavy alcohol users may have bone marrow hypofunction; half these cases are related to folate deficiency, which may reflect poor intake, decreased capacity to store folate and impaired jejunal folate absorption. Anemia in the heavy alcohol user is due to multiple causes, including iron deficiency (from gastrointestinal bleeding), decreased red cells survival defects of marrow production and nutritional deficiencies.

Persistent leukopenia and thrombocytopenia are markers of long term alcoholism. A minority of alcoholics have neutropenia, although this may be more common among those with infections. Thrombocytopenia, which may be present in up to 25% of acutely intoxicated patients, is likely due to both decreased production and survival of platelets; return to normal platelet counts occurs after two to four weeks of abstinence. Coagulation studies do not change after acute alcohol ingestion; fibrinolytic and coagulation factor changes occur only with chronic alcohol intake.

Gynecologic

There are numerous gynecologic and obstetrical complications associated with heavy alcohol consumption. Specifically, amenorrhea, dysfunctional uterine bleeding, dysmennorhea, infertility and premenstrual syndrome have been described. The obstetrical complications include spontaneous abortion, still birth, premature labor, and low birth weight infants. It is estimated that one-third of babies born to women drinking more than 6 alcoholic beverages per day during pregnancy will have fetal alcohol syndrome.

Metabolic

The metabolic disturbances due to acute alcohol intoxication are complex. Metabolic acidosis from vomiting and dehydration, respiratory alkalosis from withdrawal, sepsis or pain, and metabolic ketoacidosis all may be superimposed. Electrolyte disturbances including hypokalemia, hyponatremia, hypomagnesemia and hypophosphatemia are not uncommon, particularly when persons with chronic alcohol abuse and malnutrition start binge drinking.

Health care providers must be prepared to detect problem drinking, educate, treat acute and chronic complications and provide referrals for substance abuse treatment.

Central Nervous System.

Neurologic disorders constitute a large, diverse and devastating subset of medical complications of alcoholism.[9] Complications involve every level of the nervous system and may be caused by a combination of direct neurotoxic effects, nutritional factors and genetics. Alcohol intoxication (with blood levels reflecting levels in the brain) first affects vestibular and cerebellar functions, causing nystagmus, dysarthria and ataxia; further intake may lead to mild confusion, stupor, respiratory suppression, and coma. The comatose alcoholic patient poses an array of diagnostic possibilities that includes mixed-drug overdose, head trauma, electrolyte disturbances, meningitis and ketoacidosis. Although intoxication is legally defined in most places as 100 mg per deciliter, levels as low as 47 mg/dl are associated with increased risk of motor vehicle accidents. Chronic tolerance (thought to be due to adaptive changes in membrane lipids, neuromodulators, neurotransmitter receptors, ion channels and G proteins) permit alcoholic patients to remain sober in the face of extremely high ethanol concentrations.

Heavy alcohol intake for a short periods of time, or lower level ingestion over prolonged period leads to physical dependence. Cessation of drinking, or reduction in intake in the physically dependent person may lead to a withdrawal syndrome. This syndrome is characterized by autonomic hyperactivity, nausea and vomiting, insomnia, tremor, agitation and perceptual disturbance that includes visual or auditory illusions. Symptoms begin within hours of withdrawal onset, peak at 24 to 36 hours, and may be suppressed by resumption of drinking, beta-adrenergic receptor blockade or alpha 2- adrenergic blockade.

A minority of persons (20-30%) undergoing withdrawal have generalized tonic-clonic seizures early in withdrawal. For patients who have seizures after the first 24 hours of withdrawal, who have focal neurologic deficits or have signs of head trauma, brain imaging is required to evaluate for a treatable abnormality such as a subdural hematoma.

The most serious and delayed (day 2 to 4) manifestation of withdrawal is delirium tremens. Approximately 5% of those hospitalized for withdrawal develop delirium tremens which is characterized by profound confusion and agitation and severe autonomic hyperactivity including tachycardia and fever. Frequently precipitated by other illnesses (pancreatitis, trauma), delirium tremens resolves in 80% of cases within 72 hours but 5% of patients may die. These outcomes have not changed significantly over the past two decades despite the widespread use of benzodiazepines to limit the discomfort of withdrawal.

Wernicke's encephalopathy, caused by thiamine deficiency classically includes the triad of encephalopathy, ophthalmoplegia (nystagmus, lateral rectus palsies), and ataxia. Although only a third of patients with acute Wernicke's encephalopathy have all three signs, a majority are profoundly disoriented. Yet only a subset of thiamine-deficient alcoholics have Wernicke's encephalopathy; how thiamine deficiency leads to the characteristics brain lesions is unclear. With prompt repletion of thiamine (100 mg

of thiamine per day for at least five days), ocular signs improve within hours and ataxia and cognitive signs within days, most likely representing biochemical improvement rather than a structural lesion's reversal. A majority of these patients are left with Korsakoff's syndrome, a disabling anterograde and retrograde memory disorder.

Many long term heavy alcohol users have impaired performance on neuropsychological tests even when sober which may be due to premorbid intellectual deficits, ethanol neurotoxicity, head trauma, and nutritional deficiencies.

Chronic cerebral degeneration may occur after 10 or more years of heavy use, although this condition does not correlate with daily or lifetime consumption patterns, and the cause remains unknown. It is usually of subacute onset, with gait ataxia the prominent symptom.

Alcoholic patients also have high incidence of peripheral nerve disorders, most commonly polyneuropathies thought due to thiamine deficiency and other B vitamin deficits. Gradually progressive, the clinical findings are usually symmetric and distal including numbness, paresthesias, cramps, weakness, and loss of tendon reflexes. Improved nutrition and abstinence often result in improvement.

Alcoholic myopathy may present acutely or more slowly. The acute form, which is rare, develops over hours (often during a binge) and is characterized by weakness, tenderness and swelling of the affected muscle. Most often involving proximal muscles, elevated serum creatinine kinase is present, as is myoglobinuria, and there is necrosis of muscle fibers on biopsy. Chronic myopathy is more common. The major findings are muscle weakness and atrophy affecting the hip and shoulder groups. The cessation of drinking leads to improvement in most patients.

Trauma

The degree of alcohol intake is predictive of traumatic death. Younger drinkers are more likely to be involved in alcohol-related accidental deaths than older persons. But alcohol is also associated with nonfatal injury and minor trauma may be a clue to excessive drinking. Alcohol and drug addiction are also major risk factors for suicide, both as cause and precipitant.

The association of alcohol intake and hip fracture is meaningful particularly for women. The risk of hip fracture increases significantly for women under 65 who consume 2 to 6 ounces per week of alcohol.[10]

Drug Interactions

Alcohol interacts with hypnosedatives (antihistamines, barbiturates, benzodiazapines), phenothiazines and opiates to cause respiratory depression. With warfarin, alcohol can increase anticoagulant potency. With acetominophen, hepatotoxic metabolites cause liver necrosis. Alcohol may interact with tricyclic antidepressants to increase the risk of seizures and arrythmias. Disulfiram-like reactions can occur with chlorpropramide, metronidazole, isoniazid and some cephalosporins.

Conclusion

The health consequences of alcohol use depend on the characteristics of the consumer. Biochemical vulnerability, age when alcohol is most heavily used, and patterns of consumption all affect clinical outcomes. For young adults heavy alcohol use increases rates of accidental death and suicide, for middle aged persons, osteoporosis, depression and breast cancer, and for older persons, particularly women, hip fracture.

Alcohol and other drug use often coexist. Violence and physical and mental illness are inextricably linked with substance use. Because the age of heavy alcohol use has dropped over the past two decades, primary prevention must begin in the community. Preventive health care requires early identification of those at risk for complications.

When alcohol-related complications occur, providers may have a special opportunity to direct patients who are receptive into alcohol treatment. While there is continued disagreement about risk levels of alcohol consumption for individuals, once a medical complication of alcohol use has occurred, it may serve as an aid in breaking though patients' denial of their problem drinking. Health care providers must be prepared to detect problem drinking, educate, treat acute and chronic complications and provide referrals for substance abuse treatment.

References

1. Klatsky AL, Armstrong MA, Friedman GD. Alcohol and Mortality. *Ann Int Med* 1992;117:646-54
2. Bullock KD, Reed RJ, Grant I. Reduced mortality risk in alcoholics who achieve long-term abstinence. *JAMA* 1992;267:668-72.
3. Frezza M, Dipadova C, Pozzato G, et al. High blood alcohol levels in women. *N Eng J Med* 1990;322:95-99.
4. Cyr MG, Moulton AW. Substance abuse in women. *Obstet Gynecol Clinic North Am* 1990;17:905-23.
5. Hohmann AA. Gender bias in psychotropic drug prescribing in primary care. *Med Care* 1989;27:478-90.
6. Avins AL, Woods WJ, Lindan CP, et al. HIV infection and risk behaviors among heterosexuals in alcohol treatment programs. *JAMA* 1994; 271: 515-518.
7. Urbano-Marquez A, Estruch R, Fernandez-Sola J, et al. The greater risk of alcoholic cardiomyopathy and myopathy in women compared to men. *JAMA* 1995;274:149-154.
8. Regan TJ. Alcohol and the cardiovascular system. *JAMA* 1990;264;377-81.
9. Charness ME, Simon RP, Greenberg DA. Ethanol and the nervous system. *N Eng J Med* 1989;321:442-452.
10. Felson, DT, Kiel DP. Anderson JJ, Kannel WB. Alcohol consumption and hip fracture: The Framingham Study. *Am J Epidem* 1988;128:1102-1107.

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Psychiatric Disorders in Alcoholics

Timothy I. Mueller, MD

While depression is by no means unknown when people stop drinking, it is usually on a scale that is not menacing.

–William Styron,
"Darkness Visible"[1]

PSYCHIATRIC SYMPTOMS OCCUR VERY commonly in people with alcohol dependence or abuse (alcoholism). In fact, estimates vary up to 90% or more for the presence of any mental health disorder in alcoholics. Fortunately, most of these symptoms resolve with abstinence and no other specific attention. In some people the symptoms of a psychiatric disorder do not resolve, either because they do not stop drinking or because they have co-occurring psychiatric disorders and alcoholism. This article will focus on the second group—the group popularly known as the "dual-diagnosed."

Epidemiology

Since alcohol intoxication and withdrawal can mirror so many psychiatric symptoms, the issue of diagnostic overlap and alcohol-induced mental disorders has complicated the understanding of the dually-diagnosed (Table 1). To address issues of diagnostic overlap the field of psychiatry has refined its diagnostic system to indicate when a psychiatric disorder is causally related to a psychoactive substance and when it is not.[2] In addition, elaborate schemes have been developed for research purposes to tease out the relationship. For the practicing clinician there are some useful "rules of thumb" to guide in the assessment. Time is the most powerful. If the mental health disorder begins earlier than the alcoholism, it is termed a primary psychiatric disorder and viewed as independent. If the psychiatric syndrome persists after four weeks of sobriety, or during a historical window of sobriety, it is generally considered to be independent of the alcohol. If it persists over many months or years in the context of the variable use of alcohol, it is likely independent. All things being equal, if the patient has a family history of the mental disorder in question, it raises the likelihood they too are afflicted. And finally—"when in doubt, ask the patient." Many times the patients themselves can determine when a group of psychiatric symptoms is separate from, or caused by, alcohol use.

Abbreviations Used:

AA	Alcoholics Anonymous
APA	American Psychiatric Association
ECA	Epidemiologic catchment area
DSM	Diagnostic and Statistical Manual
PTSD	Post-traumatic stress disorder
SSRI	Selective serotonin reuptake inhibitor

In diagnostic studies which consider the diagnostic challenges, there clearly remains an elevated risk for psychiatric disorders among alcoholics compared to non-alcoholics. Table 2 summarizes the risk for the major disorders as determined by the large community-based Epidemiologic Catchment Area Study, relying on DSM-III diagnostic criteria.[3,4] This catalog of co-morbidity is the best effort to date to identify the co-occurring psychiatric disorders as distinguished from the transient states related to alcohol intoxication or withdrawal.

Schizophrenia

The combination of the two chronic mental disorders, schizophrenia and alcoholism, calls to mind the archetypical dual-diagnosis patient. These patients are typically very ill, have drifted to low socioeconomic status, and either reject or are non-compliant with treatments. Their care

Table I

Alcohol Intoxication

Depressive Symptoms:
sadness, low energy, decreased interest in pleasureable activities, decreased libido, guilt, suicidality, disturbed sleep and appetite.

Axis II, personality disorders
Antisocial behavior -
fighting/aurgumentativeness, criminal behavior, consistent irresponsibility
Borderline Personality Disorder
chaotic relationships, dangerous/impulsive activities, suicidality, mood instability.

Alcohol Withdrawal

Depressive Symptoms:
see above

Anxiety Symptoms
restlessness, difficulty concentrating, irritability, muscle tension, sleep disturbances, obsessions about drinking or other life activities, palpitations, sweating, trembling, nausea/abdominal distress

Psychotic Symptoms
hallucinations, paranoia, feelings of depersonalization

challenges the treatment systems.[5]

No evidence suggests an etiologic connection between alcohol and schizophrenia although 3.8% of alcoholics suffer from schizophrenia. In my experience alcohol is soothing to the schizophrenic patient and helpful for the anxiety and agitation that is often part of the disorder. Drinking can also enable the schizophrenic to engage in a normalizing behavior with a group which is highly permissive, thus allowing schizophrenics some sense of "fitting in." Unfortunately the alcohol use often becomes "non-normative," leading to further non-compliance and recurrence of the psychotic disorder.

The treatment of the schizophrenic alcoholic requires that the treatment system adapt to the specific needs of the patient. [6] In most successful efforts the mental health system coordinates the care. That is the system best equipped to use the case-management, community-based approach (e.g., mobile treatment teams) necessary for the long-term treatment. Additionally, mental health workers are most comfortable with the "craziness" that thought-disordered patients exhibit. For this reason, many community mental health centers establish "double-trouble" groups based on the 12-step/AA model, specifically designed for the alcoholic schizophrenic. In addition, the treatment team should take a very long view of treatment—years rather than months, to anticipate and plan for relapse to drinking and medication non-compliance, to actively develop and teach healthy social alternatives to drinking, and to strive for increased lengths of abstinence and decreased amounts of drinking, rather than complete sobriety. Programs that have adopted such goals have demonstrated rates of stable remission from alcoholism exceeding 50%.[6]

Affective Disorders

Alcoholics disproportionately suffer from major depression and bipolar disorder (manic depression). Although the majority of alcoholics experience depressive symptoms while drinking or withdrawing, most of these symptoms resolve.[7] Nonetheless, about 11% of alcoholics suffer from major depression at some point in their lives compared with about 6% of the general population. Although depressed patients often report that drinking provides transient relief from their symptoms, this is short-lived and, in fact, continued drinking worsens the long-term course of depression.[8] The elevated rate of suicidal behavior represents an especially alarming danger of alcoholism and depression.[9] Alcoholics admitted to a psychiatric facility compared to those not admitted experience roughly a 25-fold increase in the rate of subsequent suicide and demonstrate a 55% increase in suicidal thoughts and behavior if depressed compared to non-alcoholic depressives.

Many times the patients themselves can distinguish between when a group of psychiatric symptoms are separate from or caused by alcohol use.

The theory of self-medication, namely that drugs and alcohol are used to treat the unpleasant symptoms of major depression, suggests that effective antidepressant therapy might decrease drinking.[11] Although the antidepressants have not been shown effective in reducing drinking in non-depressed alcoholics, they may be effective in depressed alcoholics, especially those whose depression improves. Two recent studies, one using desipramine[12] and the other using imipramine[13] provide tantalizing evidence that the pharmacologic treatment of depressed alcoholics can improve depressive symptoms and improve but not totally eliminate alcohol use. Studies are underway to examine the effectiveness of the selective serotonin reuptake inhibitors (SSRI's) and depression-focused psychotherapy in this same group.

Bipolar disorder with mania is a dramatic episodic psychiatric disorder. In its full form it is fundamentally different from the "mood swings" many alcoholics experience. It occurs in about 6% of alcoholics compared to a lifetime prevalence of 0.8% in the general population. Excessive alcohol use is often part of the grandiose exuberance that accompanies mania and is also an effective (but not medically sanctioned) agent for temporarily managing that same energy. Although lithium has not held up to its initial promise as an effective agent for the treatment of alcoholism, it is an effective treatment for bipolar disorder and when it successfully controls the affective illness it appears to help decrease drinking.

Anxiety Disorder

Anxiety disorders are common in alcoholics, affecting approximately 21.5%. The most common are agoraphobia, social phobia and simple phobia. Alcohol is a potent anxiolytic; alcohol withdrawal is potently anxiogenic. Little is known about the interrelation between effective treatments of anxiety disorders and alcoholism.[14] Most anxiety syndromes improve with abstinence, but little data informs the converse—the effect of anxiety treatment on drinking. There is ample evidence to demonstrate that the benzodiazepines, which are the most commonly used anti-anxiety agents, are a disastrous treatment for alcoholism. The benzodiazepines simply substitute for the alcohol and ultimately have no effect on drinking. Many would argue that exposing an abstinent alcoholic to benzodiazepines actually increases the risk of relapsing. There is little empirical evidence to support this sensible rule of thumb. One study of patients with bona fide anxiety disorders treated with benzodiazepines who were subgrouped by whether or not they had a history of alcohol dependence, showed no differential predisposition to abuse the benzodiazepine and none developed active alcoholism over a 12-month period of follow-up.[15] Nonetheless, the tricyclic antidepressants (and probably SSRI's) and cognitive therapies provide equally efficacious, although less rapidly active alternatives to the benzodiazepines for alcoholics with anxiety disorders.

A wealth of recent literature notes the increased prevalence of histories of significant life trauma in alcoholics

Table 2

Lifetime Prevalance Rates for Selected Mental Health Disorders† in the Alcoholic*

	Lifetime Prevalance General U.S. Population	Lifetime Prevalence with co-morbid alcoholism	Odds Ratio**
Alcoholism*	13.5%	–	–
Any Mental Health Disorder other than alcohol or drug use disorders	22.5%	36.6%	2.3
Schizophrenia	1.4%	3.8%	3.3
Any Affective Disorder	8.3%	13.4%	1.9
Any Anxiety Disorder	14.6%	19.4%	1.5
Antisocial Personality Disorder	2.6%	14.3%	21.0
Drug/Abuse/ Dependence	6.1%	21.5%	7.1

*Alcohol Dependence or Abuse
**Odds Ratios are calculated for co-morbid risk compared to a non-alcoholic population
†Adapted from Reiger et al., JAMA 1990; 264:2511-2518

who seek hospital treatments.[16] Even in the absence of Post-Traumatic Stress Disorder (PTSD), approximately 30% of hospitalized patients of both sexes report significant experience with prior sexual or physical violence. The etiologic implications will require further study to disentangle, especially since many alcoholics grew up in alcoholic households, but therapeutically we need to be mindful of these life experiences and consider them when confronted with the alcoholic with extreme relationship problems or cryptic anxiety symptoms.

Personality Disorders

Despite formal admonitions in the literature that there is no "alcoholic personality," many alcoholics have comorbid personality disorders. According to DSM-IV, personality disorders are characterized by a maladaptive pattern of inner experience and behavior, beginning before age 18, which affects at least two of the following: cognition, emotions, interpersonal relationships or impulse control. Alcoholics are affected to a greater degree by "Cluster B" personality disorders, especially Antisocial and Borderline Personality Disorder (Table 3). Antisocial personality disorder affects 14% of alcoholics, and although the data are less systematic, borderline personality disorder is somewhat less prevalent. These patients present the clinician with the greatest challenge primarily since the therapeutic relationship depends so heavily on "the relationship," and these patients are disordered in just this area. Useful treatment strategies include setting clear and reasonable limits, providing structure, using cause and effect cognitive techniques, demonstrating and modeling empathy and the capacity to tolerate mistakes, focusing on relapse prevention, tolerating a graded series of treatment goals rather than absolutes, and being aware of one's own often intense feelings about these patients.[10]

Drug Dependence and Abuse

The misuse of other psychoactive substances is the most common "other psychiatric disorder" in alcoholics. Nearly 22% of alcoholics also meet criteria for lifetime drug dependence or abuse. Treatment facilities have seen this trend for a long time. The "pure alcoholic" is increasingly uncommon. There is certainly geographic variation in the most commonly used drugs. Similarly, trends change as a drug's popularity waxes and wanes. The ECA revealed a descending order of involvement in drug-abusing alcoholics: cocaine, barbiturates, opiates, hallucinogens, amphetamines and marijuana. The implication is that we clinicians should be mindful of other psychoactive substance use and abuse in an alcoholic patient, lest we reinforce patients' efforts (conscious and unconscious) to conceal their drug use from us.

Treatment

To the clinician accustomed to treating people with multiple chronic disorders, it will come as no surprise that it is necessary to treat both alcoholism and the accompanying psychiatric illness. One would hardly expect a patient's emphysema to improve simply because their non-insulin dependent diabetes is under control. So it is with the dually diagnosed. No empirical evidence demonstrates the efficacy of any psychiatric treatment in the actively drinking alcoholic. What little evidence there is suggests that pharmacotherapies are not maximally effective; indeed, any clinician who has tried to do psychotherapy with the actively drinking alcoholic quickly learns the futility of the effort. The effect of alcohol on the psychiatric organ—e.g., the brain— is too powerful. The essential step is establishing sobriety. Establishing sobriety is often a process beset by setbacks and false starts, and should begin in concert with the psychiatric treatment.

Only the monoamine oxidase inhibitors are contraindicated in the active alcoholic (wine and beer are the main culprits) so I will often begin treatment for a clear psychiatric disorder before the patient has achieved a well-established sobriety. As physicians we have virtually the entire range of psychopharmacologic agents at our disposal. The strategy of beginning pharmacotherapy before well-established sobriety runs the risk of exposing patients to potentially ineffective treatment if they relapse, but serves to cement a therapeutic bond by offering patients the hope of relief from their psychiatric symptoms. Patients often return for a medication refill if they have relapsed when they would otherwise be too humiliated to return solely for a relapse in their alcoholism. The array of antidepressants has no significant abuse potential, whereas addictive

Table 3

Antisocial Personality Disorder

Pervasive disregard for any violation of the rights of others since age 15 with at least three of the following:

1. repeated law-breaking with or without arrest
2. lying, deceit, conning
3. impulsivity
4. repeated physical fights or assaults
5. reckless disregard for the safety of self or others
6. repeated failure to honor work or financial obligations
7. lack of remorse for wrong-doing

Borderline Personality Disorder

Pervasive patterns of irritability beginning in early adulthood with at least five of the following:

1. frantic efforts to avoid real or imagined abandonment
2. unstable and intense interpersonal relationships
3. unstable self-image or sense of self
4. dangerous impulsivity
5. recurrent suicidal behavior
6. marked mood instability
7. chronic feelings of emptiness
8. inappropriate and intense anger
9. transient stress-related paranoia or dissociative experiences

Adapted from American Psychiatric Association, Diagnostic and Statistical Manual of Mental Disorders, [2]

properties of the benzodiazepines warrant careful and limited use.

The primary caution in the treatment of co-morbid psychiatric disorders is to avoid the trap that the medication or therapy will be sufficient treatment for the drinking behavior. Psychiatric treatments are an important part of the therapeutic package, but alcoholism requires its own focused treatment. Alcoholics Anonymous, involvement in one's church, psychotherapy, family therapy, disulfiram (Antabuse), naltrexone (Revia), counseling with an alcohol counselor, rehabilitation in a halfway house, and cognitive-behavioral treatments are the mainstays of treatment. Just as I would inquire about the effectiveness and side effects of the antidepressant I am prescribing, it is essential that at each visit I also inquire about the status of the patient's alcoholism and its treatment. Open and honest exploration of these issues demonstrates my willingness and comfort to manage these chronic and disabling disorders. When successful, the treatment of the dual-diagnosis patient is one of the rewarding experiences in clinical medicine. Often these people are "restored" to a productive level of functioning that was unimaginable to them, their families or me when they were ill.

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References

1. Styron W. *Darkness Visible: A Memoir of Madness.* Random House, New York, NY, 1990.
2. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition. Washington, DC, American Psychiatric Association, 1994.
3. Helzer, JE, Pryzbeck TR. The co-occurrence of alcoholism with other psychiatric disorders in the general population and its impact on treatment. *J Studies on Alcohol* 1988; 49:219-224.
4. Regier, DA, Farmer ME, Rae DS, et al. Comorbidity of mental disorders with alcohol and other drug abuse. *JAMA* 1990; 264:2511-2518.
5. Wallen, MC, Weiner HD. Impediments to effective treatment of the dually diagnosed patient. *J Psychoactive Drugs* 1989; 21:161-168.
6. Drake, RE, McHugo GJ, Noordsy, DL. Treatment of alcoholism among schizophrenic outpatients: 4-year outcomes. *Am J Psychiatry* 1993; 150:328-329.
7. Brown SA, Inaba RK, Gillin JC, et al. Alcoholism and affective disorder: Clinical course of depressive symptoms. *Am J Psychiatry* 1995; 152:45-52.
8. Mueller TI, Lavori PW, Keller MB, et al. Prognostic effect of the variable course of alcoholism on the 10-year course of depression. *Am J Psychiatry* 1994; 151:701-706.
9. Cornelius JR, Salloum IM, Mezzich J, et al. Disproportionate suicidality in patients with comorbid major depression and alcoholism. *Am J Psychiatry* 1995;152:358-364.
10. Walker R. Substance abuse and B-cluster disorders II: Treatment recommendations. *J Psychoactive Drugs* 1992; 24:233-241.
11. Khantzian EJ. The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine dependence. *Am J Psychiatry* 1982; 142:1259-1264.
12. Mason, BJ, Kocsis JH, Ritvo EC, Cutler RB. A double-blind, placebo-controlled trial of desipramine for primary alcohol dependence stratified on the presence or absence of major depression. *JAMA* 1996; 275:761-767.
13. McGrath PJ, Nunes EV, Stewart JW, et al. Imipramine treatment of alcoholics with primary depression: A placebo-controlled clinical trial. *Arch Gen Psychiatry* 1996; 53:232-240.
14. Schuckit MA, Hesselbrock V. Alcohol dependence and anxiety disorders: What is the relationship? *Am J Psychiatry* 1994; 151:1723-1734.
15. Mueller TI, Goldenberg IM, Gordon AL, et al. Benzodiazepine use in anxiety disordered patients with and without a history of alcoholism. *J Clin Psychiatry* 1996; 57:83-89.
16. Brown PJ, Recupero PR, Stout R. PTSD substance abuse comorbidity and treatment utilization. *Addictive Behaviors* 1995; 20:251-254.

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The Pharmacological Treatment of Alcohol Dependence

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THE OPTIMAL TREATMENT OF ALCOhol dependence should address both the psychological consequences of alcohol use and the physical and psychological factors which contribute to use. Psychosocial treatments, ranging from less intensive group or individual outpatient psychotherapy to more intensive residential treatment, may help patients achieve sobriety, develop skills to avoid alcohol, acquire methods of coping with stress, and improve self-esteem. Self-help groups, such as Alcoholics Anonymous (AA) and Rational Recovery, also help many patients avoid alcohol and should be suggested for all patients.

Pharmacotherapy - the use of medications to treat alcohol dependence - can also assist in recovery. Certain medications may reduce drug-craving, decrease protracted withdrawal symptoms, or decrease positive reinforcing effects of alcohol. Pharmacotherapies can treat co-morbid psychiatric disorders which provide part of the impetus for drinking. Pharmacotherapies should always be integrated into a comprehensive treatment plan. Types of pharmacological therapies used in the treatment of alcohol dependence are depicted in Table 1.

Aversive Therapy

Disulfiram

Disulfiram (Antabuse®) is an irreversible inhibitor of the enzyme acetaldehyde dehydrogenase, used to reduce drinking in alcoholism. If alcohol is consumed in the presence of this drug, the toxic metabolite acetaldehyde accumulates in the body, producing tachycardia, flushing of skin, intense diaphoresis, dyspnea, nausea and vomiting. If large amounts of alcohol are consumed in the presence of disulfiram, severe hypotension and cardiac arrest can occur. The presence of this reaction provides a strong deterrent to the consumption of alcohol for some patients. Double-blind treatment studies comparing the effectiveness of disulfiram to placebo found the medication most effective for those who believed in its efficacy and who remained compliant with treatment.[1] Direct supervision of disulfiram consumption has been shown to increase its effectiveness.[2]

Disulfiram is available in 250 mg tablets; the usual dose is 250 mg once daily. Daily doses of 125 mg to 500 mg are sometimes used, depending on side-effects and patient response. Disulfiram is best utilized in conjunction with ongoing psychosocial treatment for alcoholism. The optimal duration of treatment is unknown - most patients use the medication for brief periods of high risk of relapse; however, some patients use the medication continuously for years. Some clinicians administer an alcohol challenge - a small dose of alcohol- to all their patients receiving disulfiram to produce a slight disulfiram-alcohol reaction.

Because the disulfiram-alcohol reaction can be severe, patients started on disulfiram must be informed about the dangers of small amounts of alcohol in foods, shaving lotion, mouthwashes and over-the-counter medications. Disulfiram may interact with other medications, notably anticoagulants and phenytoin. It is contraindicated in patients with liver disease. A complete blood count and liver function tests should be monitored prior to starting disulfiram therapy and periodically during treatment.

Abbreviations Used:

AA	Alcoholics Anonymous
FDA	Food and Drug Administration
GABA	Gamma aminobutyric acid
5HT	5-hydroxy-tryptamine
SSRI	Selective serontonin reuptake inhibitor

Blockade of Craving and Reinforcement

Naltrexone and Other Opioid Antagonists

The opioid neurotransmitter system in the brain appears to mediate some of the effects of alcohol. If animals are provided with alcohol and administered opioid agonists, such as morphine, they increase their alcohol consumption. If animals are administered opioid antagonists, such as naloxone and naltrexone, they reduce their alcohol consumption.

Controlled clinical trials with the opioid-antagonist naltrexone show similar effects on reducing alcohol consumption in alcoholic humans. In one double-blind study comparing 12 weeks of naltrexone to placebo in 97 recently abstinent alcoholics receiving psychotherapy, the naltrexone-treated subjects had lower rates of relapse to

TABLE 1

PHARMACOTHERAPIES USED IN ALCOHOLISM TREATMENT

1. Aversive therapy - Disulfiram
2. Administration of an agent to suppress craving and effects of alcohol, such as naltrexone
3. Pharmacotherapy of co-morbid psychiatric disorders, such as depression

heavy drinking, consumed fewer drinks per drinking-day, and had lower drop-out than did the placebo group.[3] Another 12- week double-blind, placebo-controlled outpatient naltrexone trial with 70 male alcohol-dependent patients found the group treated with naltrexone had a lower relapse rate, fewer drinking days, decreased craving and a longer time to relapse.[4] For those subjects who did drink alcohol, the naltrexone-treated patients were less likely to continue to drink than the placebo-treated patients.

These initial studies have now been supported by other researchers. A study with a related opioid antagonist nalmefene also found increased abstinence in the medication group.[5] A double-blind placebo-controlled study of the effects of naltrexone on alcohol drinking in non-alcoholic social drinkers found less alcohol consumption when the subjects received naltrexone, compared to placebo.[6]

On the basis of these positive treatment studies, the Food and Drug Administration (FDA) approved naltrexone (ReVia®) for the treatment of alcoholism. The usual dose is 50 mg per day, although doses of 25 mg to 100 mg per day have been reported effective. Naltrexone should only be used in the context of a comprehensive alcoholism treatment program, which includes counseling and other psychosocial therapies. The most common side-effects include anxiety, sedation and nausea in approximately 10% of patients. High doses (300 mg per day) have been associated with hepatotoxicity; however, hepatic toxicity is rarely observed at 50 mg per day. It is recommended that liver functions be monitored prior to naltrexone treatment and periodically thereafter. Patients with hepatitis or severe liver disease should receive naltrexone only with close monitoring.

The mechanism by which naltrexone reduces alcohol consumption is unknown. It is hypothesized that reinforcing and dependence-producing properties of several drugs, including ethanol, are mediated through dopamine in the nucleus accumbens of the brain.[7] Ethanol increases dopamine turnover in the nucleus accumbens; naltrexone and other opioid antagonists block the ethanol-induced release of dopamine.[14] The reduced dopamine release due to naltrexone would result in less positive reinforcement due to ethanol, and may thus result in decreased ethanol intake. Both social drinkers and alcoholics recieving naltrexone and alcohol report less positive reinforcement and more intense sedative effects of alcohol.

Certain medications may reduce drug-craving, decrease protracted withdrawal symptoms, or decrease positive reinforcing effects of the drugs

Serotonergic Medications

Medications which augment central serotonergic function appear to reduce ethanol consumption in animals and man. Serotonergic agonists, such as d-fenfluramine (Redux®), which release serotonin from neurons, have also been reported to decrease ethanol consumption in rats. Selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine (Prozac®), sertraline (Zoloft®), zimelidine, and citalopram, which augment serotonergic function, also appear to reduce alcohol consumption in animals and humans.[8] Several human studies on non-depressed heavy drinkers found that SSRIs reduced overall alcohol consumption by approximately 15 - 20%. Patients receiving SSRIs report decreased desire and liking for alcohol. Other studies have yielded less impressive results. A recent double-blind study comparing fluoxetine and placebo treatment in non-depressed alcoholics receiving psychotherapy found no difference in drinking between groups.[9]

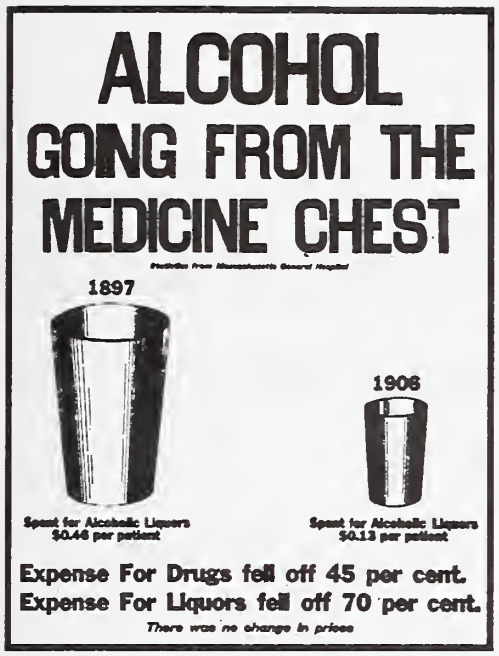
Buspirone (Buspar®) is a non-benzodiazepine anxiolytic medication which has partial agonist activity at the serotonin-1a receptor and serotonin-2 receptor, as well as having dopamine-2 receptor antagonist activity. Buspirone reduces alcohol consumption in alcohol-drinking rats and may reduce drinking in alcoholic patients, particularly those with anxiety disorders. One double-blind, placebo-controlled trial of study of buspirone versus placebo in 61 anxious alcoholics also receiving behavioral therapy found that buspirone treatment was associated with less drinking and less anxiety in those completing the study.[10] However, another double-blind, placebo-controlled study of buspirone in 67 anxious alcoholics found little effect of the medication, compared to placebo.[11]

Serotonin antagonist medications have been reported to reduce alcohol consumption in animals and humans. Serotonin-3 receptor antagonists, including ondansetron (Zofran®) and granisatron (Kytril®), have anti-emetic activity and are used to treat chemotherapy-induced nausea. Ondansetron appears to reduce the euphoric effects of alcohol in social drinkers tested in a laboratory setting.[12] In an outpatient trial with alcohol abusers, ondansetron-treated patients reduced their alcohol consumption.[13] Ritanserin, a serotonin-2 receptor antagonist, has been reported to reduce alcohol consumption in animals and humans. These medications are currently being tested in clinical trials with alcoholic patients.

In several studies, lithium carbonate has reduced alcohol consumption in animals and in some patients.[14] In laboratory studies, lithium blocks the effects of alcohol in human social drinkers. However, a double-blind, placebo-controlled study of 457 alcoholics found no significant improvement in drinking due to lithium. A review of published clinical studies of lithium in alcoholism concluded that lithium was not an effective treatment in alcoholics who do not have other psychiatric problems, such as depression.[15]

Acomprosate

Acamprosate (calcium acetylhomotaurine) is a structural analogue



of y-aminobutyric acid (GABA), which appears to have agonist activity at brain GABA receptors and inhibitory activity at brain glutamate receptors. Acamprosate reduces alcohol consumption in several animal models of alcoholism.[16] In several European clinical trials involving alcoholic human subjects, acamprosate reduced craving for alcohol, reduced relapse drinking, and had minimal side effects.[17] Acamprosate is currently approved for alcoholism treatment in several European countries. It is not yet available for treatment in the United States, but is undergoing experimental clinical trials.

Pharmacological Treatment of Co-morbid Psychiatric Disorders

Depression is frequently associated with alcohol dependence. Several investigators have studied antidepressant agents in depressed alcoholics. In a double-blind, placebo-controlled trial of the tricyclic antidepressant desipramine in 42 recently abstinent alcoholics, there were no significant differences in sobriety between the groups, although there was a trend for desipramine-treated subjects to remain sober for a longer period.[18] Depressed subjects receiving desipramine had improved depression, compared with placebo. In a double-blind, placebo-controlled antidepressant trial with imipramine in alcoholics with major depression or dysathymia, those treated with the antidepressant reported improved mood and decreased drinking.[19] A trial of fluoxetine in twelve depressed, suicidal alcoholics showed decreased depression and alcohol consumption, compared to pre-treatment.[20]

Summary

Several pharmacological agents have shown efficacy in the treatment of alcohol dependence, decreasing drinking and reducing relapse in alcoholic patients. Two medications, disulfiram (Antabuse®) and naltrexone (ReVia®) have been approved by the FDA as pharmacological adjuncts in the treatment of alcoholism; other medications are under active investigation. Pharmacotherapies should always be used as adjuncts in treatment, integrated into a comprehensive treatment regimen which addresses the medical, psychological, social and spiritual needs of the patient.

References

1. Fuller RK, Branchley L, Brightwell DR, et al. Disulfiram treatment of alcoholism. A Veterans Administration cooperative study. *JAMA* 1986;256(11)1449-55.
2. Brewer C. Recent developments in disulfiram treatment. *Alcohol Alcohol* 1993;28(4):383-395.
3. O'Malley SS, Jaffee AJ, Chang G, et al. Naltrexone and coping skills therapy for alcohol dependence. *Arch Gen Psychiatry* 1992;49:881-887.
4. Volpicelli JR, Alterman AI, Hayashida M, O'Brien CP. Naltrexone in the treatment of alcohol dependence. *Arch Gen Psychiatry* 1992;49:876-880.
5. Mason BJ, Ritvo EC, Morgan RO et al. A double-blind, placebo-controlled trial of nalmefene in the treatment of alcoholism. Alcoholism Clin Exp Res 1994;18(5):1167-76.
6. Davidson D, Swift RM, Fitz E. Naltrexone increases the latency to drink alcohol in social drinkers. *Alc Clin Exp Res* 1996;20(4):732-739.
7. Wise R, Bozarth M. A psychomotor stimulant theory of addiction. *Psychol Rev* 1987;94:469-492.
8. Naranjo CA, Kadlac KE, Sanhueza P, et al. Fluoxetine differentially alters alcohol intake and other consumatory behaviors in problem drinkers. *Clin Pharm Ther* 1990;47:490-498.
9. Kranzler H, Burleson JA, Korner P, et al. Placebo-controlled trial of fluoxetine as an adjunct to relapse prevention in alcoholics. *Am J Psychiatry* 1995;152:391-397.
10. Kranzler H, Burleson JA, Meyer R. Buspirone treatment of anxious alcoholics. *Arch Gen Psychiatry* 1994;51:720-731.
11. Malcolm R, Anton R, Randall CF, et al. A placebo-controlled trial of buspirone in anxious inpatient alcoholics. *Alcoholism Clin Exp Res* 1992;16:1007-1013.
12. Johnson BA, Campling GM, Griffiths P, Cowen PJ. Attenuation of some alcohol-induced mood changes and the desire to drink by $5HT_3$ receptor blockade: a preliminary study in healthy male volunteers. *Psychopharmacology* 1993;112:142-144.
13. Toneatto T, Romach MK, Sobell MK, et al. Ondansetron, a $5HT_3$ antagonist reduces alcohol consumption in alcohol abusers. *Alcoholism: Clin Exp Res* 1991;15:382.
14. Fawcett J, Clark DC, Aagesen CA, et al. A double-blind, placebo controlled trial of lithium carbonate therapy for alcoholism. *Arch Gen Psychiatry* 1987;44:448-456.
15. LeJoyeux M, Ades J. Evaluation of lithium treatment in alcoholism. *Alcohol Alcohol* 1993;28(3):273-279.
16. Nalpas B, Dabadie H, Parot P, Paccalin J. Acamprosate: From pharmacology to therapeutics. *Encephale* 1990;16(3):175-179.
17. Lhuintre JP, Moore N, Tran G, et al. Acamprosate appears to decrease alcohol intaake in weaned alcoholics. *Alcohol Alcohol* 1990;25(6):613-22.
18. Mason BJ, Kocsis JH. Desipramine treatment of alcoholism. *Psychopharm Bull* 1991;27(2):155-161.
19. McGrath PJ, Nunes EV, Stewart JW, et al. Imipramine treatment of alcoholic with primary depression. *Arch Gen Psychiatry* 1993;53:232-240.
20. Cornelius JR, Salloum IM, Cornelius MD, et al. Fluoxetine trial in suicidal, depressed alcoholics. *Psychopharmacol Bull* 1993;29:195-199.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

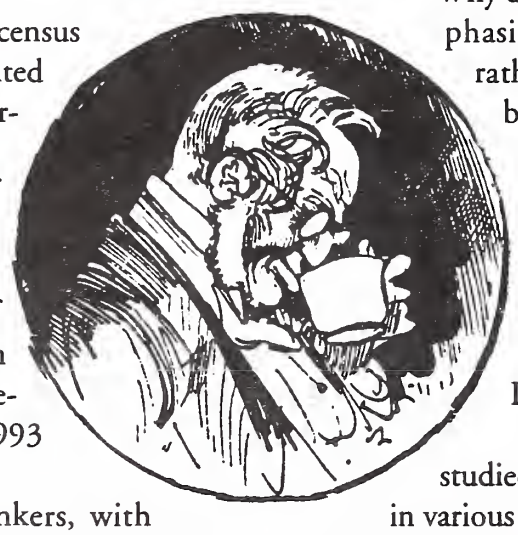
Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Declining Alcohol Consumption in the U.S. and Rhode Island

David F. Duncan, DrPH, CAS

Rhode Island and the nation as a whole are making progress toward the objective set in *Healthy People 2000* to "reduce alcohol consumption by people aged 14 and older to an annual average of no more than 2 gallons of ethanol per person."[1]

Recently released data draw upon a census of all beverage alcohol sales in the United States with statistical corrections for purchases across state lines.[2] These results indicate that nationally consumption of ethanol has already declined from 2.64 gallons per person in 1977 to 2.25 gallons in 1993. Starting at a higher level of consumption, Rhode Island achieved even greater proportionate success with a decrease from 2.93 gallons in 1977 to a 1993 level of 2.31 gallons (Figure 1).



Americans are primarily beer drinkers, with 56.7% of all ethanol consumption in the form of beer, 30.6% distilled liquor, and 12.7% wine. Typical of residents of the Northeastern states, Rhode Islanders drink somewhat more wine (16%), slightly less beer (53.6%), and about the same amount of liquor (30.4%) as do Americans in general. As can be seen in Figure 2, the decline in per capita consumption in Rhode Island is largely a reflection of declining consumption of distilled liquor — down from an average of 1.12 gallons of pure ethanol in 1977 to 0.70 gallons in 1993.

Why did the Public Health Service decide to emphasize per capita consumption of alcohol, rather than numbers of heavy drinkers, of binge drinkers, or of alcoholics? (Reductions in heavy drinking are addressed by the national objectives, but only for high school and college students). Aside from the greater ease with which consumption figures can be collected, the answer lies in a theoretical construct known as the Ledermann Hypothesis.[3]

Ledermann, a French epidemiologist, studied the distribution of alcohol consumption in various communities and hypothesized that it was always lognormally distributed, i.e., many people drank very little and a few drank a great deal (see Figure 3 for Rhode Island drinkers). If this were true, the number of heavy drinkers could be mathematically calculated based on the gross (or average) consumption. Accepting this distribution as an immutable fact, some have argued that interventions aimed at

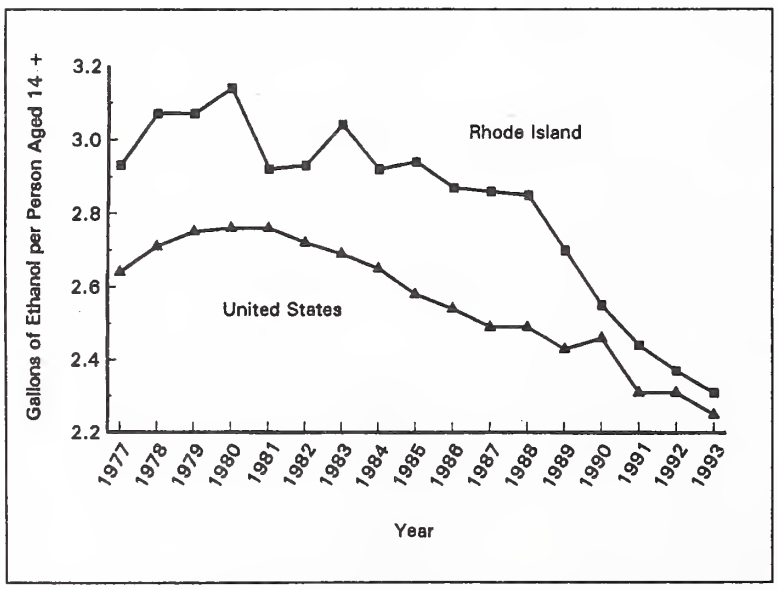


Fig. 1. Per Capita Alcohol Consumption, United States and Rhode Island, 1997-1993.

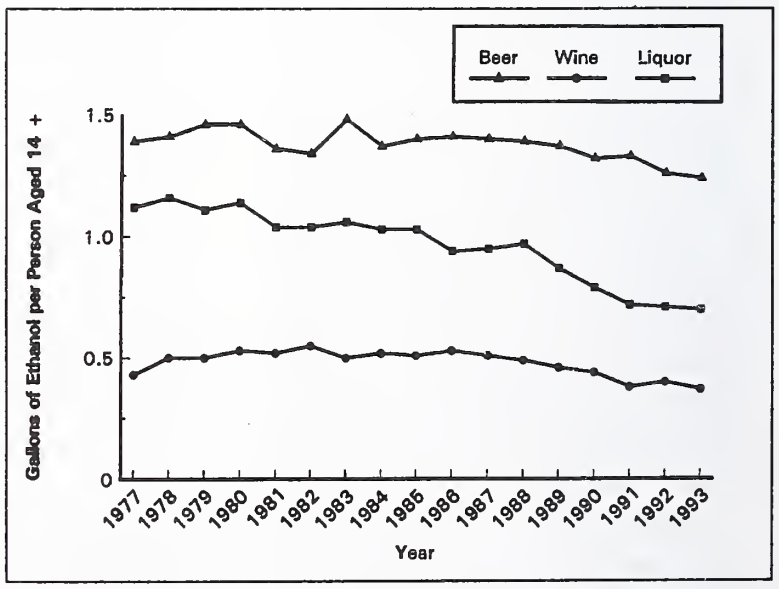


Fig. 2. Per Capita Alcohol Consumption by Beverage Type, Rhode Island, 1997-1993.

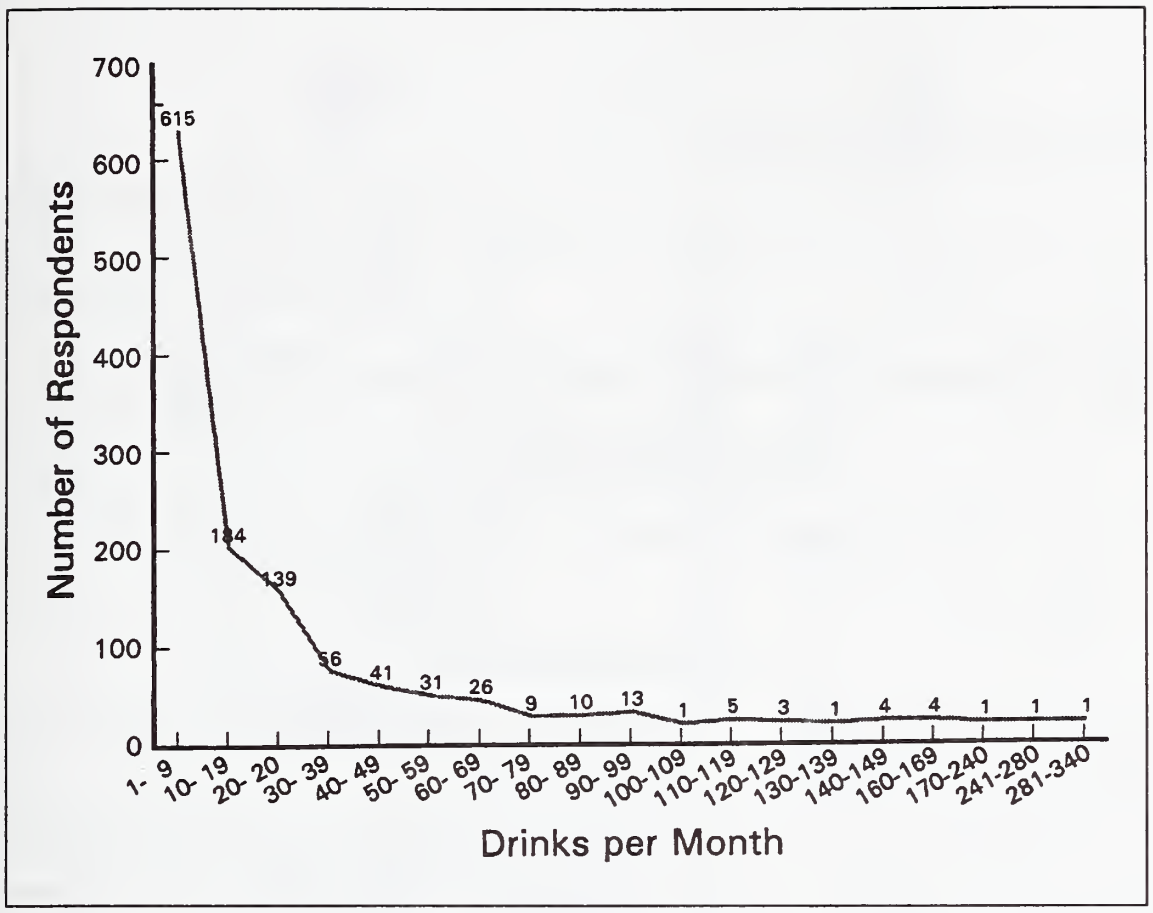


Fig. 3. Distribution of Reported Drinks of Alcohol per Month for Survey Respondents Who Drink Alcohol, Rhode Island, 1995.

heavy drinkers or groups at risk of heavy drinking are inappropriate since their numbers are fixed by the total consumption. Advocates of this view have argued that the best, and perhaps only, way to reduce the prevalence of heavy drinking and alcohol-related problems was to reduce the overall consumption levels in the community. This view has not gone unopposed, but it was influential in shaping the approach to alcohol taken in *Healthy People 2000.*

Contrary to what the Ledermann hypothesis would suggest, the recent national decline in alcohol use seems to be occurring primarily through changes at the two ends of the distribution curve, rather than evenly throughout the curve. General population surveys have shown the decreases to be due primarily to increasing numbers of abstainers and decreasing numbers of heavy drinkers, with little change in numbers of moderate drinkers.[4,5]

The picture for Rhode Island appears to differ from both the national pattern noted above and the prediction that would be made based on the Ledermann Hypothesis. While total consumption of alcohol in Rhode Island declined substantially from 1988 to 1993, data from the Rhode Island Behavioral Risk Factor Surveillance System (discussed elsewhere in this issue) indicate no pattern of decrease in heavy drinkers for the period 1990 thru 1994.[6] Similarly, these data show a decline in the number of abstainers from 1988 through 1993.[7] A decrease in abstainers, a relatively stable number of heavy drinkers, and a decline in per capita consumption - this is a combination at odds with the Ledermann Hypothesis.

What is signified by this pattern of decreased consumption, attributable largely to declining use of distilled liquor? One reasonable speculation would be that Rhode Islanders are demonstrating health consciousness by switching their beverage choices away from alcohol in its most concentrated form and toward lower alcohol content forms which may make moderation easier. Alternately, it could be due to the higher price of distilled liquor in tight economic times. Whatever the reasons, the change appears beneficial, as reflected in the continuing decline in mortality related to alcohol use in Rhode Island.[8] The failure to see any decline in heavy drinking, however, suggests that while being pleased at the reduction in per capita consumption, we should not be satisfied. Further effort at preventing heavy and binge drinking among Rhode Islanders seems to be needed.

References

1. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* DHHS Pub. # (PHS)91-50212. Washington, DC: Government Printing Office, 1991.
2. Williams GD, Stinson FS, Stewart SL, Dufour MC. Surveillance Report #35. *Apparent per Capita Alcohol Consumption: National, State, and Regional Trends, 1977-93.* Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism, 1995.
3. Miller GH, Agnew M. The Ledermann model of alcohol consumption. *Quarterly J Studies on Alcohol* 1974;35:877-898.
4. Midanik LT, Clark WB. The demographic distribution of U.S. drinking patterns in 1990: Description and trends from 1984. *Am J Pub Health* 1994;84:1218-1222.
5. Williams GD, Stinson FS, Stewart SL, Dufour MC. Surveillance Report #35.
6. Casey DB, Hesser JE, Buechner JS. *Health Risk Behaviors Among Rhode Island Adults 1990-1994.* Providence, RI: Department of Health, 1996.
7. Williams GD, Stinson FS, Stewart SL, Dufour MC. Surveillance Report #35, Table 4.
8. Largo TW. Alcohol-related mortality in Rhode Island, 1986-1990. *Rhode Island Medicine* 1995;78(1):30.

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PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Draft Protocols for the Evaluation of Breast Abnormalities

Barbara Schepps, MD, and John P. Fulton, PhD

Objective

The Rhode Island Department of Health assembled an Expert Panel on Mammography to advise the Department on assuring the quality of mammography for a statewide breast cancer screening program. After reviewing current practice and the most recent pertinent literature, the Panel proposed a draft protocol for the evaluation of breast abnormalities to inform providers associated with the screening program.

Background

Three technological advances have significantly altered the evaluation of breast abnormalities over the past five years:

- **Radiologic imaging has become more sensitive.** Mammograms today are much more likely to detect breast tumors, even in young women with dense breast tissue, than they were even a few years ago.

- **The resolution of ultrasound has increased.** High resolution ultrasound has obviated the need for histological assessment in some cases.

- **Image-guided biopsy has been perfected.** Image-guided needle biopsy, now used frequently, has replaced open biopsy in many cases. Changes in the evaluation of breast abnormalities will continue as technology advances. For these reasons any evaluation protocol is sure to change over time. The draft protocol described herein is offered as a work in progress, a useful way to understand the evaluation of breast abnormalities at present, with the understanding that change is inevitable.

Comments?

We invite your comments on the draft protocol. (Figure 1., following page)

Please send them in writing to Dr. John Fulton, column editor, either by fax (401-861-5751) or by mail (Rhode Island Department of Health, 3 Capitol Hill, Providence, RI 02908-5097).

Barbara Schepps, MD, is the Director of the Anne C. Pappas Center for Breast Imaging at Rhode Island Hospital, and Clinical Professor of Radiology, Brown University School of Medicine.

John P. Fulton, PhD, is Acting Associate Director, Division of Disease Prevention and Control, Rhode Island Department of Health, and Clinical Associate Professor of Community Health, Brown University School of Medicine.

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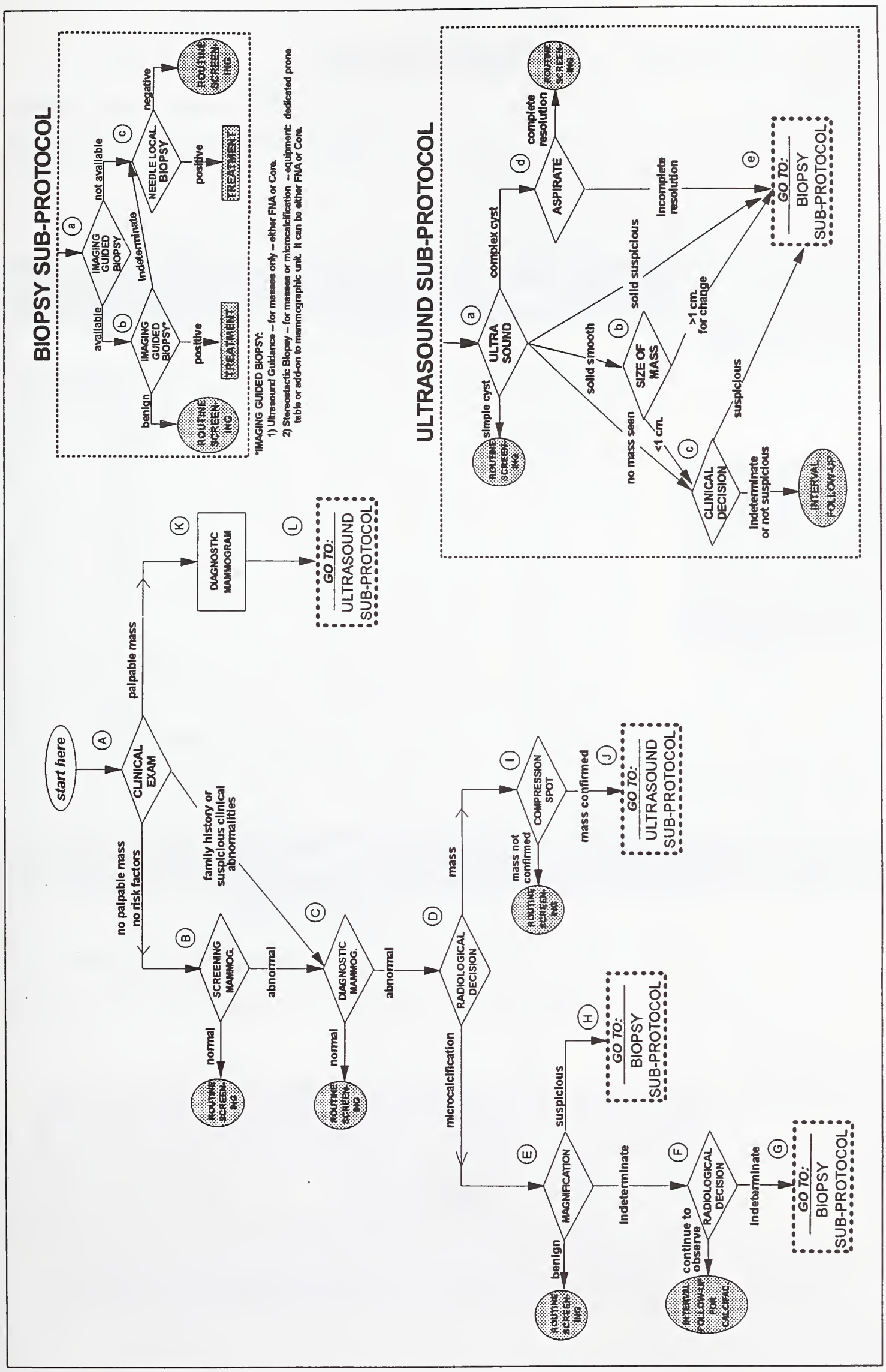


Figure 1. Draft protocol for the Evaluation of Breast Abnormalities

Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	September 1996	12 Months Ending with September 1996	
	Number	Number	Rates
Live Births	1,225	13,915	14.1*
Deaths	721	9,517	9.6*
Infant Deaths	(5)	(84)	6.0#
Neonatal deaths	(2)	(60)	4.3#
Marriages	1,058	7,881	8.0*
Divorces	283	3,304	3.3*
Induced Terminations	390	5,451	391.7#
Spontaneous Fetal Deaths	79	1,067	76.7#
Under 20 weeks gestation	(74)	(1,012)	72.7#
20+ weeks gestation	(5)	(55)	4.0#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	March 1996	12 Months Ending with March 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	298	3,269	330.3	4,051.5
Malignant Neoplasms	218	2,556	258.2	6,873.5
Cerebrovascular Diseases	55	637	64.4	532.5
Injuries (Accident/Suicide/Homicide)	23	320	32.3	5,805.0**
COPD	29	359	36.3	315.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

The World's First Medical Postage Stamp

In 1869 when the United States Postal Service issued the stamp entitled, "The Signers of the Declaration of Independence" [USA, 1869, #120] depicting a painting by John Trumbull (1756-1843), an artist of historic events in American history, they had no inkling that they were issuing what would ultimately be known as the world's first medical postage stamp.

Trumbull was born in Lebanon, Connecticut, and served as a colonel in the army during the Revolutionary War. The original painting of the signers of the Declaration is exhibited at the Yale University Art Gallery in New Haven, Connecticut. A copy may be found in the Historical Picture Hall of the Capitol Building in Washington, DC.

Dated July 4, 1776, the original painting reflected the date when the original thirteen colonies declared their formal separation from Great Britain and joined together to form a new and independent country, the United States of America.

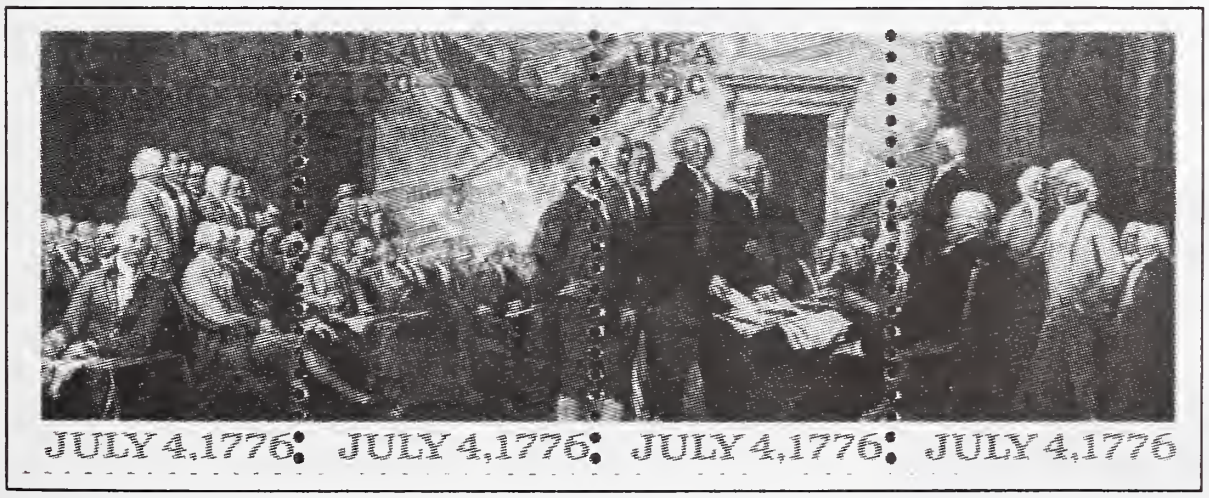
The meeting for the original signing of the Declaration of Independence was held in what is now known as Independence Hall in Philadelphia, Pennsylvania on July 4, 1776 [Independence Hall, USA, 1956, #1044]. At that time, the building was part of the medical school of the University of Pennsylvania, the first medical school established in the States. It is an appropriate site in light of the designation of the stamp, "The Signers of the Declaration of Independence," as the world's first medical postage stamp.

The reason for this designation was the fact that of the 56 signers of the original document [only 54 of whom were actually present on the fateful July Fourth], five were physicians: Mathew Thornton [1714-1803] of New Hampshire, Lyman Hall [1725-1790] of Georgia, Oliver Wolcott [1726-1797] of Connecticut, Josiah Bartlett [1729-1794] of New Hampshire, and Benjamin Rush [1745-1813] of Pennsylvania.

Unfortunately, it is not possible to display the original stamp [USA, 1869,

#120] which has a 24-cent face value and is colored green and violet. The 1995 Scott Catalogue values the stamp in mint condition at $4,000; used at $500; without grill at $6,500; and center inverted at $220,000.

One can easily imagine how crowded a stamp of average size depicting 54 well-nourished males, many of whom were seated, can be when miniaturized. To deal with the rarity, cost and size problems of the original stamp, a much newer and larger stamp - which consists of a strip of four stamps depicting the entire original painting - will be substituted [USA, 1976, #1691-1694.] The stamp was issued on the 200th anniversary of the signing of the Declaration of Independence.



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THE RHODE ISLAND MEDICAL JOURNAL

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Ninety Years Ago

[March, 1907]

Two editorials begin this issue of the journal. The first announces the imminent construction of a new hospital in Laconia, New Hampshire to cost the princely sum of $30,000. The editors applaud the far-sightedness of the citizens of the Franconia region since there are, currently, no acceptable hospital facilities between Hanover, New Hampshire and Burlington, Vermont. The second editorial decries the unscrupulousness of those local milk companies which skim off the cream prior to the sale of the milk. The cream is then sold separately. The editorial notes that this segment of milk contains its most nourishing fraction, and is particularly important for children from families with modest incomes.

The lead scientific article, written by George S. Mathews, MD, describes the author's experiences with a patient with a sub-pectoral abscess. Before entering into the clinical details of his case, the author first reviews the meager literature on this subject. Only one series had been previously published outlining the details of 23 cases collected from the literature [of which 13 died.] Of the acute abscesses of this region, many follow local trauma to the anterior chest. Many, though, seem to be of obscure origin. Some communicate with the subjacent pleural cavity. Of the chronic variety, only tuberculosis is mentioned as an etiological agent. The case in point is a 36 year old male with fever, anorexia and abdominal pains. On the fourth hospital day, the patient complained of pectoral pain. A mass was discerned and subsequently drained surgically. Purulent material was extracted from which *Staphylococcus aureus* was isolated. The article does not describe the ultimate fate of the patient.

P.E.Truesdale, MD, of Fall River, discusses the early diagnosis and treatment of gall bladder disease. The author concurs with Ewald's point of view that while dietetic and hygienic means may benefit a limited number of patients, complete cure will only be achieved through surgical intervention. After a careful review of the usual clinical signs and symptoms, the author concludes: "That it is difficult to persuade a patient who is not suffering severely to undergo the ordeal of an operation is a usual experience. However, are not the bad results of the operations performed as a dernier resort very largely responsible for the attitude of the laity ? As the mortality and morbidity after operations decrease, clear and intelligent explanations of the probabiliites will rarely meet with opposition."

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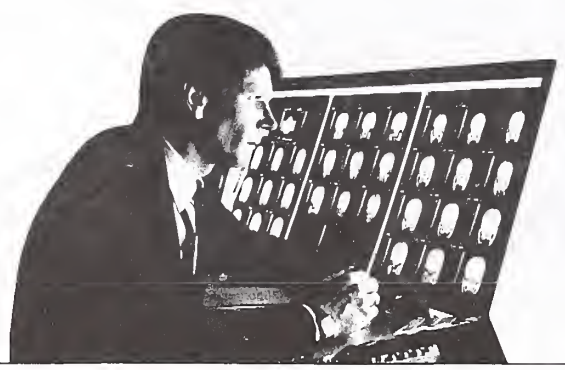

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Fifty Years Ago

[March, 1947]

Editorial topics include the need for more marketplace competition in health insurance, the establishment of a women's auxiliary to the medical society, questions concerning osteopathic medicine, and a tribute to B.H.Buxton, MD.

Leonard J. Goldwater, MD, discusses heart disease and unemployment. With an estimated 8 million employable Americans with documented heart disease, the problem demands investigation and establishment of guidelines to determine which of these adults should have access to employment.

Alex M. Burgess, MD, discusses residency and fellowship programs at Rhode Island Hospital.

William Fischer, Jr, MD, presents a case of secondary polycythemia and a case of severe anemia, contrasting their volumes of blood, plasma and circulating cells.

A case of corneal ulcer treated with penicillin solution is presented by Robert R. Chase, MD.

C.R.Metcalf, MD, R.W.Tuttle, MD, and R.W.Robinson, MD discuss the role - and deficits - of the hospitals in the postwar world. They envisage the following trends in the decades ahead: The general hospitals will begin to accept more patients with communicable diseases including tuberculosis. The Federal Government will likely subsidize the physical growth of regional hospitals. Physiotherapy will become a standard feature of many hospitals. Two tiers of nurses, one with more academic training than the other, will prevail. An increased number of physicians will have their offices within hospitals. Hospitalization costs will increase, but will be alleviated by various insurance plans. Hospitals will begin to cooperate under the sponsorship of regional councils.

Twenty Five Years Ago

[March, 1972]

In a paper entitled A Local Habitation and a Name, Frank A. Seixas, MD, Medical Director of the Council on Alcoholism, discusses the semantic and conceptual difficulties many people have in recognizing alcoholism as a medical disease rather than a moral failing or a sin. He points out that the American College of Physicians only recently adopted a resolution declaring alcoholism a disease and within the proper province of the internist. He then describes the gradual transition in thinking and the recognition by some carriers that alcoholism is indeed a sickness to be covered by insurance.

Lois Monteiro, PhD, discusses lay views on physical activity following myocardial infarction. The conclusions were based upon a comprehensive questionnaire on behavior and atitudes completed by 1,137 adult Rhode Islanders. The author concludes: "In contrast to the view that laymen have a pessimistic, fearful attitude towards coronary heart disease, these respondents tended to agree with the physicians' beliefs that a return to work and to activity are more appropriate for the cardiac than is restriction and withdrawal from an active life."

Francesco Ronchese, MD, offers a brief biography of Aldo Castellini, the internationally famous tropical disease specialist.

Necrology 1996

Antonio F. D'Angelo, MD

Dr. Antonio F. D'Angelo died January 4, 1996.

Dr. D'Angelo was a physician in private practice for 57 years in Bristol until retiring in 1984. He started on Bradford Street in 1927 and later moved to 99 State Street. In addition, he was staff physician at the former Soldiers' Home in Bristol, now the Rhode Island Veterans Home, from 1935 to 1974.

After completing pre-medical studies at Providence College in 1922, Dr. D'Angelo received a master's degree from Providence College, and a doctor of medicine degree from the University of Maryland Medical School in 1926. He interned at St. Joseph Hospital and the former Providence City Hospital.

He was a member of and physician for La Bella Sicilia Society, the Sons of Italy and the Fraternal Order of Eagles. He was a member of the American Medical Association and the Rhode Island Medical Society.

He was the husband of the late Blanche I. (Tetu) D'Angelo, RN, and of the late Mary F. (Fernandes) D'Angelo. He leaves 7 nieces, 10 nephews and many great-nieces and great-nephews.

Wilfrid V. Ethier, MD

Dr. Wilfrid V. Ethier died January 18, 1996.

For 35 years Dr. Ethier operated his medical and anesthesiology practice on Society Street in Woonsocket before retiring in 1987. He was a former physician for the Woonsocket Police Department, a member of the staff at the Woonsocket Hospital (now Landmark Medical Center), and at the Zambarano Unit of the Eleanor Slater Hospital, Pascoag. He was one of the founders and staff members of the former Fogarty Memorial Hospital in North Smithfield.

Dr. Ethier was a graduate of Providence College, the University of Montreal, and New York University School of Anesthesiology.

Dr. Ethier was past president of the Rhode Island Medical Society, a member of the Woonsocket Medical Society, a member and physician for the Union St. Jean Baptiste of Woonsocket. He served as a lieutenant in the Rhode Island Navy Reserve. He was attending physician for the area Boy Scouts. He was a member of the Knights of Columbus of North Smithfield.

He leaves his wife, Cornelia T. (Walsh) Ethier, as well as two sons, James T. Ethier of Lincoln and Charles M. Ethier of North Smithfield; four daughters, Roberta K. Dufresne, Elaine H. Frechette, Margaret M. Beaulieu, and Elizabeth A. Lavoie, all of Woonsocket; two brothers, the Rev. Robert D. Ethier of Pawtucket and Antonio P. Ethier of Woonsocket; three sisters, Jeannette Parmentier of Blackstone, Mass., Rita Ledoux of Woonsocket, and Anita Choiniere of Kingsport, Tennessee.; eight grandchildren and four great-grandchildren.

Jesse P. Eddy III, MD

Dr. Jesse Potter Eddy III died January 20, 1996.

Dr. Eddy was a Providence surgeon for more than 50 years before retiring. In the late 1930's, he founded the first blood bank in Rhode Island. In 1951, he performed the first intracardial surgery at Rhode Island Hospital.

Dr. Eddy was a 1928 graduate of Brown University and earned his PhD and MD at Cornell University Medical School in 1932.

He was an associate member of the John Carter Brown Library at Brown, and for many years provided support for medical education at the school. In 1987, he received the university's award for Distinguished Service to Medical Education. One of the major lecture halls at Brown bears his name.

He was a fellow of the American College of Surgeons, and a member of the American Medical Association, the New England Surgical Society, the Pan-Pacific Society, the International Cardiovascular Society Societe Internationale Chirurgie and the Rhode Island Medical Society. He was a founder of the Providence Surgical Society, now the Rhode Island Chapter of the American College of Surgeons.

Dr. Eddy had been a first lieutenant in the Army Medical Corps Reserve and a captain in the Medical Corps of the Rhode Island Army National Guard.

He leaves his wife, Constance Louise Burch (Jones) Eddy, three daughters, Constance Eddy Jordan of Fresno, Calif., Ann Eddy Smith of Worthington, Ohio, and Joan Eddy Waldo of Bellevue, Washington; five grandchildren and six great-grandchildren.

Herbert F. Hager, MD, FACP

Dr. Herbert F. Hager died January 29, 1997.

An internist, he had been practicing at the Physicians Office Building, 110 Lockwood Street. He was the physician for the Providence School Department from 1946 to 1978. He served on the staffs of Rhode Island Hospital, Women & Infants Hospital, and Miriam Hospital, and was on the courtesy staff of Roger Williams Medical Center and Butler Hospital. He was certified by the American Board of Internal Medicine in 1951 and named a fellow of the American College of Physicians in 1960. He was medical director at Steere Home for the Aged.

Dr. Hager was a graduate of Bates College and Tufts University School of Medicine. He received his master of public health degree from Columbia University.

He served with the U.S. Public Health Service Reserve and Regular Corps attached to the Coast Guard and the Navy from 1942 to 1946.

He was a member of a number of medical associations including the Rhode Island Medical Society. He was a corporation member of the St. Elizabeth Home in Providence. He was a member of the board of directors of the Providence Tuberculosis League. He was on the board of trustees of the Medical Care and Educational Foundation. He had been president of the Rhode Island Society of Internal Medicine. He served on the board of directors of Blue Cross-Blue Shield, and the Rhode Island Professional Standards Review Organization. He was a former member and chair of the Rhode Island Board of Medical Review.

He was the husband of the late Marion A. (Hammer) Hager. He leaves a daughter, Jean C. Hager-Rich of Cranston; two sons, Richard P. Hager of McKee City, New Jersey, and Robert E. Hager of Cranston, and two granddaughters.

Thomas L. Greason, MD

Dr. Thomas L. Greason died February 15, 1996.

Dr. Greason was director of the Neuropsychiatric Department at the Charles V. Chapin Hospital and chief of the Department of Neurology and Psychiatry at St. Joseph Hospital and Our Lady of Fatima Hospital. In 1960, he was appointed examiner for Peace Corps applicants and was a member of the state Parole Board from 1960 to 1973. Since 1979 he had been psychiatric advisor to the administrative law judges of Health, Education & Welfare in Rhode Island.

Dr. Greason was a 1935 graduate of Brown University. He received his medical degree in 1939 from Tufts College School of Medicine.

He served as president of the Providence Medical Society and on the Society's Executive Committee. He was a member of the American Psychiatric Association, the Providence Medical Society, Rhode Island Medical Society, Rhode Island District Branch of the American Psychiatric Association. He was a fellow of the Academy of Psychosomatic Medicine and was a member of the American Association of Senior Physicians.

He leaves his wife, Barbara E. (DeStefanis) Greason, two daughters, Ann C. Greason of Warwick and Charlotte Hayes of Narragansett, and three grandchildren. He was the father of the late Thomas L. Greason Jr.

Alton P. Thomas, MD

Dr. Alton P. Thomas died February 25, 1996.

Dr. Thomas was a general practitioner in Woonsocket from 1945 to 1990.

He was a 1935 graduate of Woonsocket High School and a 1939 graduate of the former Rhode Island State College, now the University of Rhode Island. In 1943, he received his medical degree from Tufts University Medical School and interned at Rhode Island Hospital. He served as captain in the Army Medical Corps in World War II.

Dr. Thomas was a member of the American Medical Association and the Rhode Island Medical Society. He was secretary-treasurer for 20 years of the Woonsocket District Medical Society. He was a diplomate of the National Board of Medical Examiners and a former president of staff of the former Woonsocket Hospital.

He leaves his wife, Phyllis (Hoyle) Palmer Thomas, a son, Jonathan A. Thomas of Providence; and two brothers, Ariel A. Thomas of Coventry and St. Petersburg, Florida, and Philip E. Thomas Jr. of Lincoln.

Marian Zawirski, MD

Dr. Marian Zawirski died March 6, 1996.

A family physician, Dr. Zawirski maintained a private practice in Cumberland for 30 years, retiring in 1984.

Born in Poland, he was imprisoned in German prison camps during World War II for more than five years before being liberated.

He was a graduate of the University of Lwow and the University of Warsaw, both in Poland. He was also a graduate of the University of Edinburgh in Scotland.

Dr. Zawirski was a member of the Rhode Island Medical Society.

He leaves his wife, Elizabeth (Pedlar) Zawirski, and several nieces and nephews in Poland.

Nina Mazur, MD

Dr. Nina Mazur died March 17, 1996.

Dr. Mazur was chairman of the Newport Hospital Emergency Department. Before moving to Newport, she held several posts in New York, where she was a pioneer in the development of emergency medicine as a specialty. She was director of the emergency department at the Brooklyn Hospital Center, an associate professor of emergency medicine at the State University of New York Health Sciences Center in Brooklyn, and founded the first residency training program in emergency medicine in Brooklyn.

A conference room at the Brooklyn center was recently named for her. She was cited for her work by the Conneticut chapter of the American College Emergency Physicians; the American Association of Women Emergency Physicians established the annual Nina Mazur Mentorship Award (of which she was the first recipient); and an annual Nina Mazur lecture has been established by the State University of New York at Brooklyn.

Dr. Mazur graduated from the University of Pennsylvania Medical School in 1975 and had further training at the Upstate Medical Center in Syracuse, N.Y.

Dr. Mazur was the president and a fellow of the Rhode Island Chapter of the American College of Emergency Physicians, a member of the Rhode Island Medical Society, and a member of the board of directors of Newport Hospital.

She leaves her husband, Forest Golden, and her father, Samuel Mazur, of New Hyde Park, New York, as well as two sons, Douglas Mazur and Dr. Andrew Mazur, both of Milwaukee, Wis.; a daughter, Juliette Birmingham of Long Beach, Calif.; a sister, Dr. Margo Schleman of Malvern, Pa.; a brother, Gregory Mazur of Scotch Plains, N.J.; two stepdaughters, Sheila Golden of Pittsburgh, Pa., and Joy Golden of New Antwerp, N.Y., and a grandson.

Nina Gunnar Nirk, MD

Dr. Nina Gunnar Nirk died March 13, 1996.

James A. McGrath, MD

Dr. James A. McGrath died March 18, 1996.

Dr. McGrath practiced in Wakefield from 1948 until retiring in 1990. He served as president of the medical staff at South County Hospital for two terms.

He was a graduate of Providence College and Tufts University Medical School in Boston. He did post graduate work at Boston City Hospital, and left there to serve as a commander in the U.S. Navy in World War II. After the war, he finished his post graduate work and returned to Wakefield and practiced from 1948 until retiring in 1990.

He was a member of the Rhode Island Medical Society, the American Medical Association and the New England Obstetrics & Gynecology Society. He was a member of the South Kingstown Elks.

Dr. McGrath was the husband of the late A. Kathleen (Kirwin) McGrath. He leaves a son, James A. McGrath Jr. of Hartford, Wisconsin; a daughter, Kathy McGrath of Wakefield, and two grandchildren.

Charles E. Brochu, MD

Dr. Charles E. Brochu died April, 1996.

A radiologist, Dr. Brochu served during World War II in the Army Air Corps and the Army Medical Corps. From 1942 to 1945, stationed in Great Britain, he supervised the establishment of x-ray departments in casualty and receiving hospitals. From 1945-1946 he was chief of x-ray at Tilden General Hospital in Fort Dix, New Jersey. In 1947 he opened a practice in Woonsocket, where he was chief of radiology at both Woonsocket Hospital and Fogarty Memorial Hospital.

He graduated from Assumption College in 1933 and Georgetown University School of Medicine in 1937.

In 1968 the American College of Radiology named him a college fellow; in 1971 Assumption College awarded him an honorary doctor of science degree.

He was a member of the Woonsocket District Medical Society, the Rhode Island Medical Society, the Rhode Island Radiological Society, the New England Roentgen Rayt, the American College of Radiology of North America and the President's Council of Assumption College.

He leaves his wife, Lucille C. (Remy) Brochu, two daughters, Marguerite Turcotte of Easton and Geraldine Kagan of Farmingville, Long Island; a son, Albert Brochu of Houston; a sister, Marguerite Bibaud of Amesbury; a brother, Andrew Brochu of Lehigh Acres, Florida; eight grandchildren, and many nieces and nephews.

Reginald A. Allen, MD

Dr. Reginald A. Allen died August 3, 1996.

Mary Colbert Pitts, MD

Dr. Mary Colbert Pitts died August 22, 1996.

Dr. Pitts specialized in internal medicine and medical oncology. During 38 years of private practice, her office was first in Providence, later in Cranston. She was on the staff at Rhode Island Hospital, Kent County Memorial Hospital and the Rhode Island Medical Center.

She received her BS from Tufts University in 1954 and her medical degree from its School of Medicine in 1958. She served her residency and fellowship at Rhode Island Hospital.

She was a member of St. Gregory the Great Church in Warwick, the Rhode Island Medical Society, The Providence Medical Association, The American Society for Internal Medicine, The Rhode Island Medical Woman's Association, Phi Beta Kappa, and the Tufts Medical Alumni Association.

Dr. Pitts was the widow of George B. Pitts. She leaves a daughter, Ann Marie Pitts Mosmiller of Warwick; a stepdaughter, Bonnie Pitts Kempe of West Virginia; a stepson, George B. Pitts Jr. of Hawaii; a

brother, David J. Colbert of West Warwick; a sister, Anne Colbert Lawlor of East Alsteak, New Hampshire; four grandchildren and a great-grandson.

Arnold Porter, MD

Dr. Arnold Porter died October 3, 1996.

Dr. Porter was a third-generation Rhode Island surgeon. Like his father and grandfather, Dr. Porter was on the staff of Rhode Island Hospital. During World War II, he was a flight surgeon in Europe, retiring as a major. After the war he served as an instructor in surgery at Harvard Medical School.

During a 40+ year affiliation with Rhode Island Hospital, he served in many surgical capacities including Surgeon-in-Charge, Division of Pediatric Surgery, and Surgeon-in-Charge of Surgical Service. His medical specialties were pediatric surgery and the pioneering design and development of the State of Rhode Island's first Trauma Center. He recognized the need for the specialty of Emergency Medicine and, in addition to developing the facilities and manpower for that service, he led several state-wide initiatives. In 1981 he became the first Chief of the Department of Emergency Medicine at Rhode Island Hospital.

Dr. Porter played a seminal role in the Program in Medicine at Brown University: in 1953, 22 years before Brown awarded its first MD degrees, Dr. Porter was appointed to the faculty. At the time of his death, he was Clinical Associate Professor Emeritus of Surgery at Brown University Medical School.

He was a member of the Rhode Island Medical Society, as well as active in Blue Cross and Blue Shield, rising to president and chairman of the board in the 1960s and 1970s.

He was a graduate of Yale University and Harvard Medical School. He did his surgical training in pediatrics at the Children's Hospital and Peter Bent Brigham Hospital in Boston.

Dr. Porter leaves his wife, Gladys (Hinckley) Porter, and four daughters, Gladys Gifford of Cambridge, Massachusetts, Priscilla Wolff of Los Angeles, Nancy Porter of Arlington, Massachusetts, and Mary Porter of Minneapolis, and nine grandchildren.

Justine B. Zompa, MD

Dr. Justine Zompa died October 5, 1996.

Dr. Zompa had been a staff physician for Harvard Pilgrim Health Care of New England, since 1988. She was a clinical assistant professor of obstetrics and gynecology at Brown University.

She received her bachelor of arts degree from Rutgers University in 1980, where she was a Phi Beta Kappa, a member of the Microbiology Society and the Pheobold Smith Society. She graduated from Rutgers Medical School, where she was a member of its Alpha Omega Alpha Society. From 1984 to 1988, she served her residency at Women & Infants Hospital, Providence. She became board certified in 1990.

She was a member of the American Medical Association, the Rhode Island Medical Society and the American Medical Woman's Association.

Dr. Zompa leaves her husband, John Zompa Jr., her parents, Dr. G. Robert and Phyllis E. (Miller) Bonsignore of Gulf Breeze, Florida, and two children, John Robert Zompa and Jeannette Nicole Zompa, both at home; two brothers, Marine Corps Maj. Robert G. Bonsignore of Pensacola, Fla., and Nicholas G. Bonsignore of Andover, N.J.

Brian A. Dorman, MD

Dr. Brian A. Dorman died October 28, 1996.

Dr. Dorman, a general surgeon at Rhode Island Hospital for 36 years, was clinical associate professor of surgery at the Brown University School of Medicine. He was an active staff member of Rhode Island Hospital and Women & Infants Hospital since 1965. At the time of his death he was acting Chief of the Second Surgical Service at Rhode Island Hospital.

Dr. Dorman was a 1951 graduate of Trinity College in Hartford. He served in the Army for two years before receiving his medical degree in 1959 from New York Medical School. He interned at the U.S. Public Health Service Hospital in Staten Island, New York, from 1959-60, and served a surgical residency at Rhode Island Hospital from 1960-65. In 1967 he was certified by the American Board of Surgery.

He was an executive committee member of the New England Surgical Society, and a past president of both the Rhode Island Hospital Staff Association and the Providence Surgical Society. He was a member of the Rhode Island Surgical Society, the New England Cancer Society, the American College of Surgeons, and the Rhode Island Medical Society.

He leaves his wife, Janet (Page) Dorman, a daughter, Nancy E. Dorman of East Greenwich; two sons, Brian D. Dorman of East Greenwich, and Bradley P. Dorman of Providence; a sister, Beverly A. Soderberg of Warwick; a brother, David A. Dorman of Brooklyn, Connecticut, and a granddaughter.

Richard H. Dowling, MD

Dr. Richard H. Dowling died December 7.

Dr. Dowling specialized in obstetrics and gynecology in Woonsocket from 1936-1981. He had been chief of staff at Woonsocket Hospital.

Dr. Dowling graduated from Providence College in 1928. In 1932 he received his medical degree from Georgetown University Medical School.

He was a past president of the Woonsocket Medical Society and a member of the Rhode Island Medical Society and the American Medical Association.

He leaves his wife, Margarete (Billings) Dowling, two sons, Michael R. Dowling of North Smithfield and Richard M. Dowling of Whitinsville, Massachusetts; two sisters, Anna Landy of Woonsocket and Julia Sullivan of Norwich, Conn.; four grandchildren and seven great-grandchildren.

D. Richard Baronian, MD

Dr. D. Richard Baronian died November 15, 1996.

Dr. Baronian was an internist with offices on Elmwood Avenue, Providence, for many years before he retired.

Dr. Baronian was a commanding officer of the officer-patient center at the Convalescent Hospital, Camp Butner, N.C. He served on the staffs of Rhode Island Hospital, St. Joseph Hospital and Our Lady of Fatima Hospital. He was visiting physician at the former St. Joseph Chronic Disease Hospital in Hillsgrove. He had been medical examiner for the Federal Aviation Agency and medical consultant to the Rhode Island Temporary Disability program.

Dr. Baronian was a graduate of Tufts University and its Medical School. He interned at Sayles Memorial Hospital (now Memorial Hospital of Rhode Island) and completed his residency in internal medicine at Boston City Hospital.

Dr. Baronian was a life fellow of the American College of Physicians, a diplomat of the American Board of Internal Medicine, and a past president of the Rhode Island Society of Internal Medicine. He was a delegate to the Rhode Island Medical Society. He was a chairman of the Diabetes Fair for many years, as well as the liaison between the Rhode Island Medical Society and the Rhode Island Prison Administration. He was a past treasurer of the Providence Medical Association.

He leaves his wife, Annette (Aaronian) Baronian, a daughter, Marilyn Barsalona of Coral Springs, Florida.; a brother, Leo Baronian of Cranston; two sisters, Anna Pryor of Providence and Nora DeSimone of Johnston; and two grandchildren. He was the father of the late Richard James Baronian.

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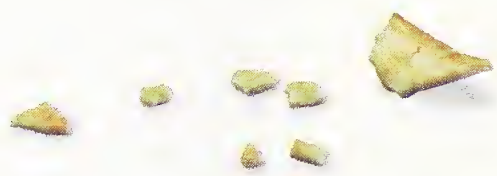

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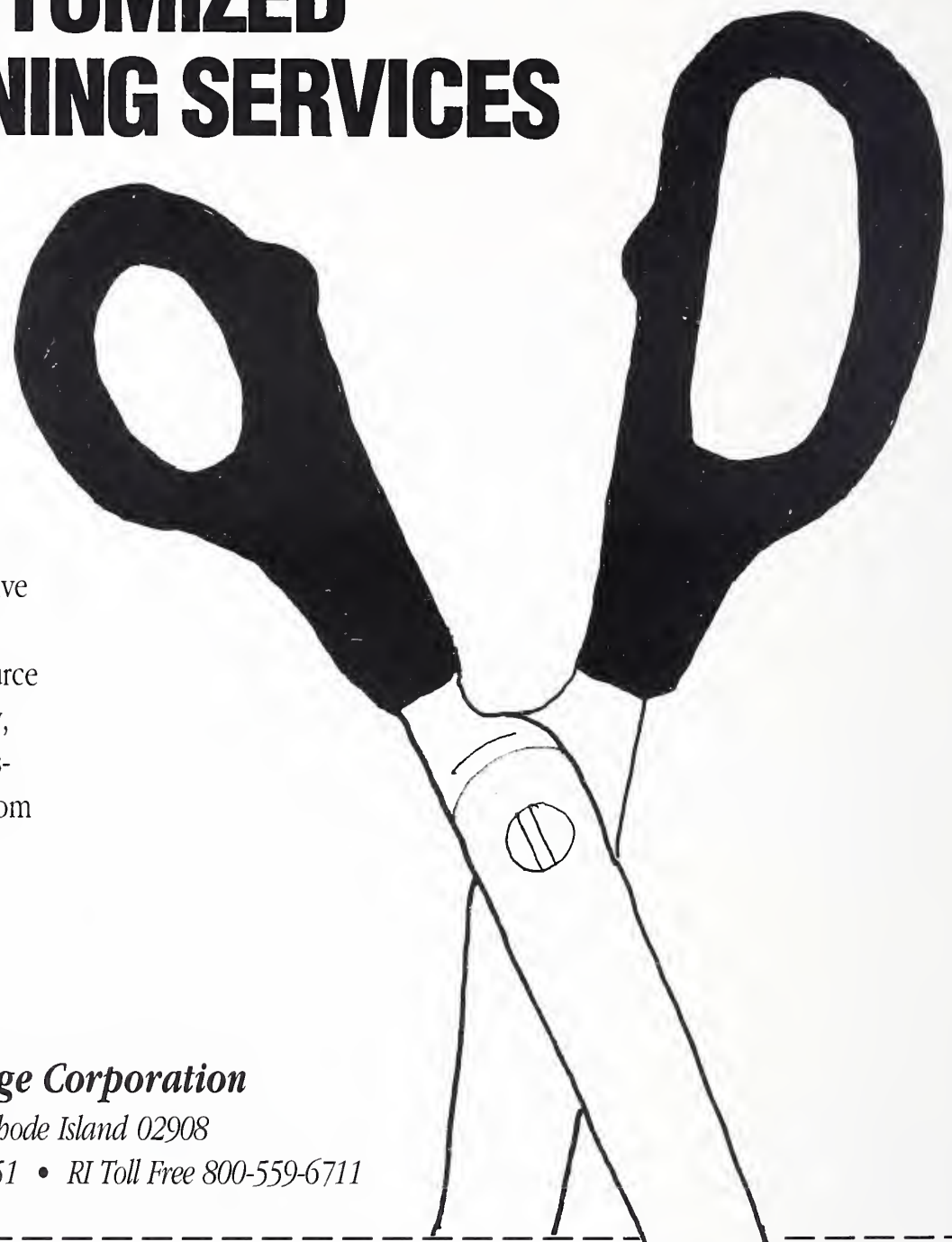

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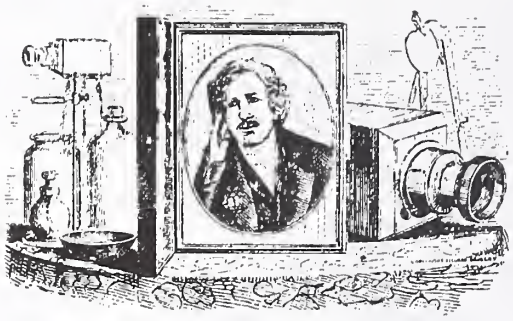
COMMENTARIES



A Tale of Truant Names

A NAME IS A FRAGILE THING RARELY OUTliving its owner. Sometimes though, by virtue of having rendered some great clinical insight or being credited with some discovery, a scientist's persona lingers and may then even be appended to a disease, an anatomic structure or a laboratory test [eg, Alzheimer's disease, bundle of His or Wasserman test]. Uncommonly, a name may become truly imperishable as a descriptive adjective [eg, pavlovian, freudian]. And when the surname is no longer capitalized it has truly entered a Valhalla reserved for the immortals.

But, sadly, there are also instances when the remembrance of the scientist's involvement fades completely although, perversely, his name persists as a disembodied adjective or noun. Take, for example, a common microbiology laboratory object, the petri dish. Does the word petri describe its purpose, its composition, its manufacturer - or the name of the scientist who designed it ? And then we encounter other technical adjectives or nouns which have long since lost their visible connection with some creative human being. Words such as bunsen [as a form of laboratory-bench burner], geiger [as a counter], condom [as a contraceptive], and even guillotine, exploit an otherwise obscure scientist's surname to define a unique instrument or device. With the passage of time, the chasm between the creator and the object created becomes so wide that the initiating scientist, as a person, is effectively forgotten. These names, having finally achieved an independent life of their own, have even lost the capitalization of their first letter which once served to indicate that they had been a family name.

The petri dish was invented by Julius Petri [1852-1922], an obscure assistant bacteriologist working in the state-subsidized laboratories of the great Robert Koch. Petri modified the shape of the culture dish used for the plating of unknown specimens. Petri's design vastly simplified the dish, making it easier to conform to the bacteriologist's palm, thus speeding up the process of plating specimens upon the poured, solid culture medium. His design also altered and simplified the covers so that they effectively sealed off the lower chamber from external contamination. Furthermore, the units were made interchangeable and inexpensive to produce.

In 1855 Bunsen devised an inexpensive laboratory burner, using illuminating gas as its fuel, the novel design of which permitted the amount of admitted oxygen to be controlled at its base by a simple sleeve-valve. And while this modest advance immortalized his name, clearly the many other scientific contributions of Robert Wilhelm von Bunsen [1811-1899] were substantially greater. Bunsen was professor of chemistry at Marburg and later in life professor at the University of Heidelberg. He was Europe's greatest authority on the chemistry of the arsenicals, and he invented the carbon-zinc electric battery, the first practical quantitative laboratory photometer and a functioning calorimeter. Bunsen and his colleague Kirchhoff, in 1860, were the first to isolate the element cesium, an alkali metal. The spectral emission lines of cesium were bright blue and therefore he chose the name cesium [from the Latin *coesius* meaning sky blue.] In 1861 Bunsen and Kirchhoff discovered yet another element, rubidium. One of the spectral lines of this rare element was deep red; the name they selected, rubidium, was derived from the Latin, *rubidus,* meaning deep red.

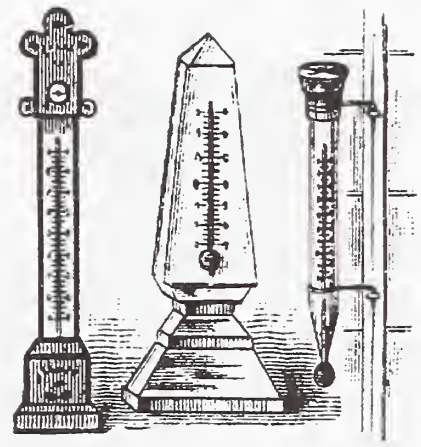
Hans Geiger [1882-1945], was a German physicist who had invented a portable instrument for the detection of radioactivity. Joseph Guillotin [1738-1814] was a French physician who had recommended decapitation as a more humane means of state execution. The machine now bearing his name, however, was designed by another physician named Antoine Louis.

The historic origins of the condom, even the derivation of its name, lie in confused obscurity. The variously offered etymologies are at best speculations. The most extensive dictionary of English, the 1928 Oxford edition, handles the confusion with forthright Anglican resoluteness: it denies that the word exists. Yet another major dictionary announces soberly that Condom is the name of an obscure French village which was the site of a major battle during the Hundred Years' War [and countless American tourists have changed their itineraries so that they might send postcards to friends post-

marked from "Condom."]. The Third Edition of Webster declares that an 18th century English physician named Conton was the "reputed inventor" of a contraceptive contrivance. Some have contended that the name is not eponymic but that it descends from the Latin, *condere,* meaning to hide or protect. Other, less timorous, texts suggest a variety of alternate hypotheses. One of the more popular theories proposes that a 17th century British physician named Dr. Condem had devised a male contraceptive from the cecum of a sheep for his patron, Charles II of England. The Grose *Dictionary of the Vulgar Tongue,* published in 1785, states that the device was invented by "one Colonel Cundum." This source observes further that the device had also been employed as a scabbard-covering for officers' swords. In keeping with this military deployment was philologist Ciardi's observation that large numbers of condoms had been distributed to the British infantry in World War II to be used as sheaths for the distal ends of their rifles thus protecting the barrels from rain and dirt.

Most sources, however, seem to agree that a human being named Condom [or Conton or Contum] had existed, that he was British and that he probably was a physician living in the 17th or 18th centuries. Romans, however, had recourse to sheath-like contraceptives almost two millenia before the 17th century. And if a Dr. Condom did exist, it is likely that his meager contribution was the modification rather than the invention of the device.

The English language is littered with nouns, even verbs, which barely hint at their authentic roots in the name of some forgotten mortal. Thus, there are words such as boycott, lynch, macadam, sandwich, silhouette, galvanize, nicotine, macintosh, shrapnel, and even dunce, all of which began innocently enough as a family name; but because of some action by the owner of that name, whether laudable or not, the private family name became surrogate to the action. Eventually the word took on a generic role,



lost contact with its mortal origins and flirted then with immortality. Petri's descendants, if such exist, might appeal in vain to reestablish some connection with this legendary name. But on the other hand, anyone unfortunate enough to inherit, for example, the name Boycott would be forced to explain, repeatedly, why his family had been stigmatized with such a bizarre surname. And in the case of Guillotin's children, they would be forced, finally, to change their family name.

– Stanley M. Aronson, MD

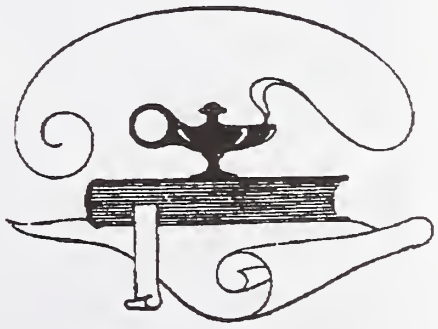
The Industrialization of Medicine

When I was in the eighth grade, in a class called General Language, the teacher chose several of us to debate the proposition, "It is not possible to think without words," and, of course, we settled nothing. Now since the structuralists and deconstructionists have sown their confusion, questions about thought, words, and reality can no longer be framed intelligibly.

We think, or rather I think I do, mostly by talking to ourselves. Our ancestors moved their lips when they read silently. Surely something happens somewhere between our conscious and unconscious selves, somewhere in the left cerebral hemisphere, before the word is ever formed, but the word once chosen then reshapes reality, coloring and biasing the original idea. You recall that in Orwell's *Nineteen Eighty Four,* Newspeak " ... had been devised to meet the ideological needs of Ingsoc, or English Socialism."

Society's guardians, levelers all, are busy transforming English usage into a kind of Newspeak making our world view coincide with theirs. Medicine has been turned into, and therefore must always have been, the health-care industry. Consider how these words bring up images of manufacturing, trade, large corporate enterprise, profit making, production [as an old Detroiter, I see the Rouge plant with its coke ovens and smoke stacks.]

Healthcare [now one word] and health maintenance are Madison Avenue talk, promising what can never be. Even medical schools and their hospitals have become academic *health* centers. In his 1966 book, *Ferment in Medicine,* McGraw never mentions



health care, only medical care. In the 1966 Millis Report, *The Graduate Education of Physicians,* the authors have included a section on "Health Care," but it treats only of sanitation, immunization, public health, dietary instruction, physical fitness programs, as well as of agriculture, engineering, and education - things having to do with keeping the public's health, not caring for the sick. Health care, meaning the professional work of physicians, nurses, allied medical sciences and hospitals, came into common usage only in the late 1960's with the effort to convert medicine into an amalgam of social science [apologies to Prof. Virchow] and industry.

Even more pernicious, patients are now consumers, customers, or clients - "lives" to the insurance moguls, to be bought and sold - and in the collective, they represent markets. Physicians are providers, and "deliver healthcare." Hospitals compete to grab market share by "expanding their product lines," and are members of a trade association. Young physicians deciding on where to practice consider "lifestyle," a word not in my 1971 Webster's, which opens them wide to temptations of the "Firm." A distinguished surgeon from the University of Texas was courted by a Califiornia for-profit HMO with the offer of a million dollar salary, a mansion and a Jaguar. He had the guts to say "No."

In an editorial regretting the tragic, violent deaths of Dr. John D. Haugh and his wife Patricia in West Hartford last month, the Hartford *Courant* referred to Dr. Haugh as Mr. Haugh and never mentioned that he was an orthopedic surgeon. A distinguished older physician, a patient at the Memorial Sloan-Kettering Cancer Center several years ago, was regularly addressed as Mr., or just as often by his first name, by "healthcare workers" who had never known him before. Let's have no elitism here !

Do churches and synagogues and their staffs constitute the "God industry" or "Religion industry" ? Surely it won't be long before their members are described as clients, customers, consumers, or "giving units." Are courts and judges part of the law industry ? And the schools ? Education is surely an industry because its "workers" are unionized, as are some professors, but we will cringe hearing education called an industry.

These words change the way the public and their masters, and even some of us "healthhcare providers" see the world: changing a historic profession into a cynically commercial profit-pursuing trade is no problem: devise a Healthspeak that will make "all other modes of thought impossible." A retired colleague called me the other night from Florida, "You know Bob, it would be so easy. The doctors only have to say 'No' ! After all, these guys can't make it without us." Easier said than done. Too many have already gone over to the other side; "you've got to go with the tide, it's the future," they say.

I think our patients may make us wake up; they are discovering that care "delivered" by profiteering healthcare corporations is not quite what they had in mind when they granted us a license to practice medicine.

– Robert U. Massey, MD

Dr. Massey is Professor Emeritus, Department of Community Medicine and Health Care, University of Connecticut School of Medicine and Editor of Connecticut Medicine. *This commentary appeared originally in the December 1996 issue of* Connecticut Medicine.

Bell, Book & Candle

"YOU SEE BUT YOU DO NOT OBSERVE." The time was 1876, the place was Edinburgh's Royal Infirmary, the audience was a group of young and eager medical students, and the speaker was the distinguished professor of systematic surgery, the eminent Dr. Joseph Bell.

For centuries the Bell clan had contributed materially to the welfare of Scotland. The early Bells, of Norman origin, were warriors defending the Highland; and another, less bellicose Bell - transplanted to the United States - had invented the telephone.

Joseph Bell was the fifth in a succession of Bells to teach and practice medicine in Scotland's capitol city. He was born in 1837 and attended the patrician Edinburgh Academy, Scotland's answer to Eton and Harrow. The Academy, adjacent to Haig's Distillery, was noted for its dedication to the Scriptures, the Classics and corporeal punishment.

At the time of Bell's birth the city was singled out as the most polluted municipality in all of western Europe. No sewer system had yet been established, or even envisioned, and the surface filth and odors provided Edinburgh with its better known name of *"Auld Reekie."* Typhoid, smallpox and typhus were endemic challenges to the local medical profession. But the city was also home to a Faculty of Medicine arguably, in mid-19th century, the most eminent medical school in the world. Medical historians have listed Edinburgh's medical school as part of a select "apostolic succession" of acclaimed schools of medicine which included, in historic sequence, the centers in Salerno, Bologna, Padua, Montpellier, Paris and Leyden.

In 1854 Bell commenced his medical studies at Edinburgh University, an institution without frills or even basic amenities. An impatient and unforgiving faculty, intolerant of laxness, demanded hard work. The atmosphere confronting the struggling student was harsh, cruel, and at times bordered upon the intolerable. The suicide rate amongst medical students was tragically high. Bell lived a frugal and disciplined existence, allowing only a fondness for English poetry and a deeply religious spirit to intervene occasionally between himself and his medical studies. He fulfilled all of the academic requirements and was personally chosen by the great surgeon James Symes to be his dresser [the term for resident physician.]

At age 21, Bell graduated with 61 other successful candidates and began his labors on the surgical service of the Royal Infirmary, his professional home for the next 30 years. Other than a secure marriage, a modest interest in horticulture, an occasional game of cricket and his weekly attendance at church, Bell was to be found regularly on the surgical wards or in the adjacent chemistry laboratory pursuing his interest in developing diagnostic tests.

In 1864, while caring for large numbers of victims during a major epidemic of diphtheria, Bell contracted the disease and, for the remainder of his life, was left with a residual limp and a partial vocal chord paralysis. Despite these impediments his capacity to teach medicine flourished and within a decade of his graduation, he was acknowledged as the school's most inspiring and innovative teacher. His instructing extended to the professional training of nurses; and through his close friendship with Florence Nightingale, Bell established Scotland's first school of nursing. At about this time, Bell developed two curious hobbies: dialectology, the skill of determining a person's place of upbringing merely by listening to his speech patterns; and handwriting analysis. He employed these new aptitudes repeatedly when confronting new patients in his teaching clinic.

In 1873 Bell was appointed Editor of the *Edinburgh Medical Journal*, a post he held for the next three decades. Bell's prominence now spread well beyond Scotland. He was appointed a consulting surgeon to the Crown and became, too, Britain's outstanding authority on forensic medicine. But to his eagerly attentive students, he was the great teacher, the proponent of "The Method." A former student described Bell's teaching activities and his display of "The Method" in the out-patient clinic, where patient after patient was brought before Professor Bell and an audience of avid students leaning forward in their amphitheater seats. In the words of this student, "It was there that Bell amazed

us all with the rapidity of his diagnoses, with the brilliance of some of his pieces of deductive reasoning, with the apparently irrelevant nature of some of the questions asked." Bell was described as possessing "sharp, piercing grey eyes, eagle nose and striking features."

One of Bell's medical students was a young man from Edinburgh named Arthur Conan Doyle. Doyle's apparent classroom diligence intrigued Bell, particularly his habit of taking copious notes during lectures. Another of Doyle's surgery instructors was a veteran of the Crimean War, a Dr. Patrick H. Watson.

After graduation, Doyle's medical career languished and he took to the writing of fiction to support himself. In 1887, he published his novella, *A Study in Scarlet,* introducing a new character named Sherlock Holmes. And in a 1892 letter to Bell, Doyle wrote: "It is most certainly to you that I owe Sherlock Holmes, and though in the stories I have the advantage of being able to place the detective in all sorts of dramatic positions, I do not think that his analytic work is in the least an exaggeration of some effects which I have seen you produce in the out-patient ward."

Bell's successes as a teacher of the method of deductive reasoning did not diminish his extensive private practice, and one of his patients - and later a close friend - was Robert Louis Stevenson. When Stevenson developed tuberculosis he fled to the southwest Pacific in the hopes of finding a more congenial climate. While there he came upon the first of Doyle's stories about Sherlock Holmes. Stevenson immediately wrote to Doyle exclaiming: "Can this be my old friend Joe Bell ?" And indeed many former Bell students, now established physicians throughout the British Empire, recognized the persona of Professor Bell behind the facade of Sherlock Holmes. Although Doyle consciously crafted the Holmes character upon the analytic methods of Joseph Bell, the name was Doyle's homage to yet another admired physician-writer, the American Oliver Wendell Holmes.

Bell accepted his role as the model for Sherlock Holmes with grace and modesty; but when his privacy was repeatedly discomforted by the press, in despair he belittled the Holmes stories as "a cataract of drivel." In contrast to the acerbic, autocratic Holmes, Bell remained a gentle, compassionate, "fame-encircled" physician, his profound belief in the spiritual goodness of man undiminished.

– Stanley M. Aronson, MD

Information for Contributors

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A manuscript will be accepted for consideration with the understanding that it is an original contribution, has never been published in its current form, and is submitted only to *Medicine & Health/Rhode Island.* An article should address a substantive issue of interest to the Rhode Island medical community, be no more than 3000 words in length, and have no more than 20 references.

Submission Requirements

Please submit two copies of the typed, double-spaced manuscript. In addition, please submit both the manuscript and computer-generated graphics on a computer disk, formatted in either Microsoft Word or Text Only.

Illustrations and charts must be submitted on black ink on white paper. Laser-printed graphics are acceptable, provided they are printed at 300 DPI resolution.

Photographs must be in black and white, submitted on 5' x 7' glossy paper.

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The Words on Nelly's Tombstone

The villagers of Exeter, Rhode Island, knew that farmer George Brown had a problem. First, in 1883 his wife, Mary, succumbed to a mysterious illness. Six months later, his 20-year-old daughter, Mary Olive, also fell ill and died. Within the next several years, his 19-year-old-daughter, Mercy, was also dead, and George's teenage son Edwin, a healthy lad who worked as a store clerk, became suddenly frail and sick. The village doctor informed George that "consumption" was taking his family. But the country folk had another explanation.

On a chilly March afternoon in 1892, a group of men entered Exeter's Chestnut Hill Cemetery. There they began to exhume the bodies of George Brown's wife and two daughters. They had concluded that one of the deceased was leaving the grave at night to suck the life out of its relatives. Only by killing the vampire could young Edwin be saved.

First, the men examined the bodies of Mrs. Brown and daughter Mary. Finding them to be properly decomposed, they began to exhume Mercy Brown. Slowly,

they shoveled into Mercy's grave. When they reached the corpse, the men suddenly stepped back in terror.

Mercy, who had been buried for more than two months, appeared oddly well preserved. It seemed that her hair and nails had grown. And when the men cautiously prodded the corpse with their shovel, they found that it was filled with fresh blood. The suspected vampire's heart was removed and burned on a nearby rock. The ashes were added to young Edwin's medicine. Still, the boy died less than two months later.

To the less superstitious, there was perhaps nothing so unusual about the well preserved condition of Mercy's body. She had been in the ground during the two coldest months of the year. The mysterious wave of illness that swept George Brown's family was probably tuberculosis.

But that did not keep Rhode Island from becoming known as the "Vampire Capitol of America." South County, whose isolated villages resembled the lonely hamlets of Transylvania, was a hotbed of vampire rumors between 1870 and 1900. When Bram Stoker, who wrote *Dracula* in 1897, died, newspaper accounts of Mercy Brown were found in his files.

The legends persist to this day. In Rhode Island Historical Cemetery No. 2 stands the gravestone of alleged vampire Nelly L. Vaughn of West Greenwich, who died in 1889 at the age of 19. The grave is supposedly cursed. One local university professor who studies vampirism claims that "no vegetation or lichen will grow on Nelly's grave," despite numerous attempts to plant there. And people are still taken aback by the inscription along the bottom of Nelly's tombstone. The curious words read, "I am waiting and watching for you."

– Charles Turek Robinson

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Charles Turek Robinson is a writer-archeologist from Rehoboth, Massachusetts.

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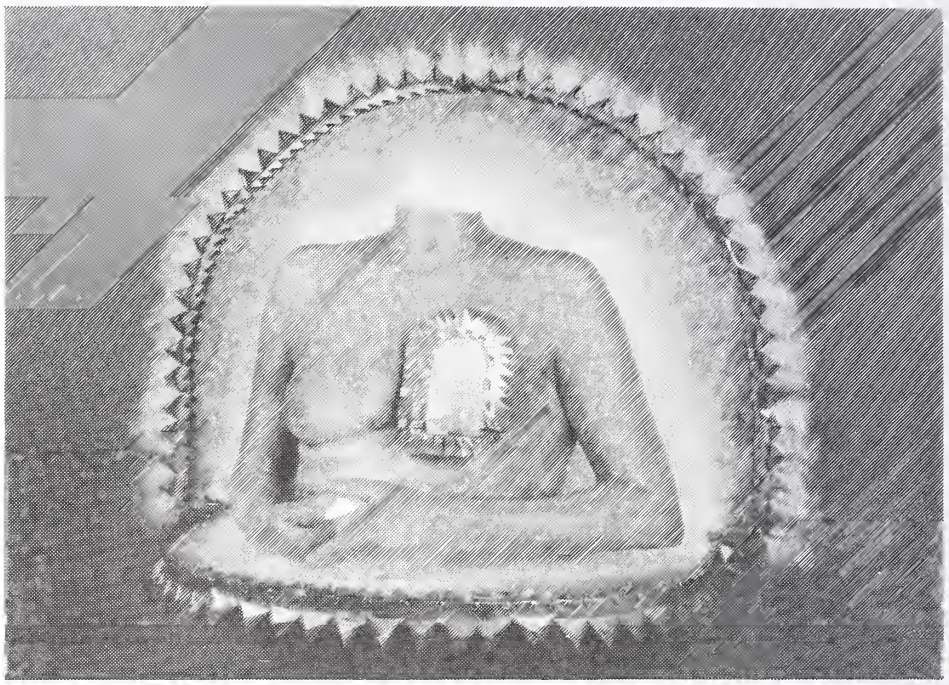
The Role of Art Within the Medical Setting

Christiane Corbat

"It has been several months since you installed "Amazon, Night Light" in our Breast Health Office. I can truly say its effect on some of my patients has been nothing short of astounding. Even before we placed it on the wall, I had the experience of dealing with a 40 year-old woman who had just undergone a mastectomy for carcinoma. She was very depressed and having considerable difficulty in dealing with the loss of her breast. On an impulse, I unwrapped the (photos of the piece) and showed them to her. She was transfixed. I do not pretend to understand the transformation that came over her but I suspect that it was a revelation to her that someone could find beauty and artistic merit in something which to her represented disfigurement, mutilation and ugliness. I have seen similar responses in several other of my patients and we have all noted that the display provokes considerable discussion and a wide range of responses."

[From a letter written to the artist by Steven I. Cohen, MD]



Christiane Corbat, **Amazon, Night Light** 1994
Amazon Series 28"h x 36"w x 19"d Plaster fabric, copper, brass, feathers, shell, electric light. Photo: Chee-Heng Yeong

Art influences and transforms life. It also heals us. The role of Art in healing, which I have come to understand through my work with individuals who face serious illness, came as a revelation to me. As an artist I became convinced of this first hand during a personal crisis over ten years ago. I made plaster castings of my body, transforming them into mythical, dream-like images of wellness which embodied the qualities I wished to have. This process not only "healed" me - it gave me a tool with which to change my life. To explore my theory, I asked friends to allow me to make similarly transformative pieces about their battles with life-threatening diseases or with their deepest fears. So began the *Warrior Series*. My intent is to create sculpture which pushes through and beyond illness or fear to a place where our personal legends and myths live within us again, and we feel healed in spirit.

There is a great deal of talk about the piece as we work on it, the myth involved, and the symbolism chosen. Probably the most important ingredient I bring to the process is that of listener. Often it is the first time someone has been asked to tell the complete story of his or her experience. The way in which I make art, as a type of ceremonial process, creates a special atmosphere which allows us to explain truths about ourselves we don't usually share. In this process of creation, people feel they can be anything and anyone. The metaphor of Art allows us to touch profound feeling without being threatened because it speaks to us in symbolic form.

Here are the stories of my collaborative encounters with some exceptional individuals, and their sculptures.

Amazon, Night Light is a casting of a forty-one year old woman who had a radical mastectomy in 1991 [the patient from the introductory letter]. The piece symbolizes the radiant life force which gets us through our darkest hours. The image of the flame and of the missing breast as an altar came about from her description of her need for "hope" and of "giving up" a breast for life. There is light in the altar (the heart's chamber), light in her protective hands, and light emanating from her whole torso. The sharp, jagged edges of metal change from surgical knife-edges to flames of more light. She is the altar, the source of light which shines steadily within her. A year and a half after making this piece she wrote: "... making the Night Light piece was a profoundly transformational experience and is still an active force in my life. There is more to this than I can make clear in the space of a quickly written lunch hour note ... but it can serve as a reminder to you that I am alive and well and still changing. It was/is such a subtle interplay of the physical sensations of the casting process itself, and our exchange of words about my life and your life and your art surrounding us as we spoke and did our work, and the dawning awareness that my cancer could be an agent of change and hope in my own life and out in the world, touching lives not known to me."

Animus Cordis was made with a man in his early forties, six years following his heart transplant. He traced an important part of recuperation to his excitement and awe at the technological, mechanical aspects of the transplant operation and of the process of recovery. It captured his atten-

Christiane Corbat, **Animus Cordis Scit Tempus Nullum**
(The Spirit of the Heart Knows No Time) Heart To Heart Series 1996
37"h x 37"w x 10"d Plaster fabric, wood, paint, metal, electric light
Photo: Chee-Heng Yeong

Christiane Corbat, **Amazon, the Offering** 1988-89
Amazon Series 39"h x 25"w x 5"d Plaster fabric, paint, flax, burlap. Photo: Chee-Heng Yeong

tion after many months of fear and anticipatory mourning for the family he thought he would lose. He saw his new heart, a wonderful gift, as a well-constructed clock, whose every heartbeat was a steady ticking sound. He becomes the sundial, the time piece of the Renaissance – linking his personal rebirth with the sun, the cycles of day and night, and the seasons. He holds another sundial in his right hand which connects solar power by slender brass sutures to the shiny clock mechanism within his chest. More golden sutures tie the large sundial to him, making him an integral part of the sun and the cycle of life. Protruding from his neck, the gnomon casts the shadow which tells the time of day. His posture is typical of the stance I often saw him in, still today a habit which protects his chest and symbolizes his courage at being able to hold himself together through the pain and trauma of disease and recovery.

Art influences and transforms life. It also heals us.

For a woman in her late fifties, The Offering was a body casting created several years after surgery to transform her mastectomy into an empowering experience. This woman is a musician who has been cancer-free for over ten years. I fashioned an image of power out of adversity, her scars turned into exciting body ornamentation usually given only to those who have proven their bravery in war. The sutures become harp strings which she can pluck to create music. The right hand offers the lost breast without shame. She explained that losing a breast, a symbol of giving, had allowed her to experience truly receiving help and support from others for the first time. There is strength, determination and acceptance in her pose. She wrote recently: "Though the body might be maimed, and in my case I lost a breast, there is one thing that cannot be destroyed; the human spirit. That comes through so clearly when I see your work. This soul, spirit, inner self, whatever it's called, is indestructible. What I'm realizing now, after having survived my own cancer, is that it's far more difficult for me to face my husband's lung cancer . When it was my cancer, I felt I was in control of myself. But now my role has switched to caregiver and it's so much harder to bear. I have no control over his cancer. My piece, The Offering, shows I'm a strong woman, determined, who loves order and a sense of control. And I am those things. But what's more important is what this piece is really about; the invincible human spirit."

An Opportunity for Choice, constructed with an economics professor in his mid-fifties, is about life in terms of free will. Seventeen years ago he almost died of cancer. He wanted a piece which would remind him of what he learned when he was fighting his cancer: every moment marks a conscious choice of how we wish to live. The chess game mirrored his way of seeing life, as a challenging possibility at

every move. Like chess, each move is an opportunity to decide on a direction or "response" to a life event. Consciously making choices at each "move" determines the entire "game" of our lives. To extend the analogy, we are playing both sides of the board. Both of these knights represent this man. In the gallery space, the simple fact of stepping onto the chess board makes the viewer part of the game. This man recently wrote: "Christiane and I exchanged gifts of meaning. I gave her the raw material - fear, isolation, vulnerability, pain, hope, occasionally a sense of the preciousness of life and moments of serenity. She formed the material in space, putting it in the light of day. She touched me and the raw material with her hands, creating a bridge between me and the world of ordinary life, now more precious. Owning the fear diminished it. Owning the serenity increased it."

Stoneman is my first male Amazon, a 76 year-old former construction worker/road-builder who discovered he had breast cancer at age 74. Within a year of his first diagnosis, he suffered the loss of his wife and was diagnosed with prostate cancer. Yet in spite of his grief, he was still involved with both family and friends. He told me a great deal about his wife, their courtship and many good years together. We laughed and cried. He described his cancer as one of life's experiences, neither fair nor unfair, which he would meet with his usual faith, courage and sense of humor. He learned to read as an adult, yet his love of puns and verbal games kept us both chuckling as we made this piece. I was drawn to create him in stone, a material he worked with all his life. His stability, his physical and moral strength, his humor, generosity of spirit and gentleness are solid and permanent regardless of his illness. The calmness of his being is felt as a physical force, symbolized in the wooded birch grove beside a lake in the lighted window in his chest.

The way in which I make art, in collaboration with people who have undergone devastating illness and the often ravaging effects of life-saving treatments, gives testimony to their terrible wounds but also to their remarkable courage. The body and mind's capacity to heal is extraordinary. An important role of Art within medicine is to help us identify this innate healing faculty and activate it within ourselves. Art helps us perceive gifts and acknowledge growth from the darkest and most difficult experiences, to transform our lives.

Christiane Corbat exhibits nationally and is recognized for her work in the movement of Art and Healing. Her studio is in Warren, Rhode Island; she is represented locally by the Virginia Lynch Gallery.

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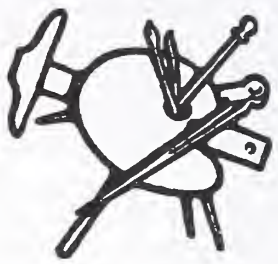

Christiane Corbat, **An Opportunity for Choice** 1995
6 ft high by 4 ft wide, the board is 8 ft by 6 ft.
Phot: Chee-Heng Yeong

Christiane Corbat, **Stoneman** 1996
48"h x 33 1/2"w x 15"d Plaster fabric, paint, wood, electric light
Photo: Chee-Heng Yeong

Chaplains in Health Care

Rev. Duane Parker, PhD

Clergy participation in health care has a long tradition. However, in modern western health care, the emphasis upon science, technology, and economics has overshadowed the role of the clergy, spirituality, and religion as contributors to health care.

Preparing Clergy for a Role in Health Care

It is often assumed that ordained clergy with a theological degree are prepared to provide effective ministry in health care. This is not the case. Clergy, like physicians, need supervised clinical experience in health care to be effective. Clinical pastoral education (CPE) programs provide this necessary preparation. Also, clergy working in health care are strongly encouraged to seek certification as chaplains and/or clinical pastoral education supervisors by one of three national professional associations.

The roots for present day clinical pastoral education programs were planted in Massachusetts by a clergyman and a physician. In 1925 The Reverend Anton Boisen started the first CPE program in a psychiatric hospital, Worcester State Hospital. A few years later a physician, Richard Cabot, MD, was instrumental in developing a chaplaincy program at the Massachusetts General Hospital in Boston.

Dr. Cabot was interested in the physical, mental, social, and spiritual roots of illness. He was asked to teach a course on ministering with the sick and the dying at the Episcopal Divinity School in Cambridge, Massachusetts. He was surprised to discover that clergy were learning how to care for the sick and dying only in the classroom. In a published article he called for clergy to have a year of supervised clinical experience similar to the supervised clinical experience for medical students and residents. Dr. Cabot wanted theological students to serve in hospitals under the supervision of experienced chaplains - to learn the art of pastoral care through observing the successes and failures of experienced practitioners. His effort along with that of others undergirded today's clinical pastoral education program.

In clinical pastoral education programs students (ordained clergy, theological students, and qualified laypersons) are assigned to a clinical setting, usually a hospital, hospice, visiting nurse agency, or mental health center. They approach patients and families offering a pastoral visit. In these visits the patients may discuss ethical dilemmas, despair, anxiety, hope, or engage in light chatter. Patients are free to participate in these conversations or may request the chaplain to leave without any conversation. Students work as team members with physicians, nurses, social workers, and other caregivers. Both individual and group supervision are offered to students. Seminars include case studies, ethical discussions, group dynamics, and didactic seminars. The didactic seminars are presented by an interdisciplinary faculty.

Nationally there are two accrediting bodies for clinical pastoral education: the Association for Clinical Pastoral Education (ACPE) and the United States Catholic Conference (USCC). These organizations establish standards for CPE programs, accredit programs and centers, and certify CPE supervisors. There are approximately 375 accredited CPE centers in the United States and many other countries now offer similar programs. An international conference is held every four years for chaplains serving in hospitals and other settings.

Abbreviations Used:

ACPE	Association for Clinical Pastoral Education
CPE	Clinical pastoral education
USCC	United States Catholic Conference

In Rhode Island

In Rhode Island Chaplain Andrew Dodd conducted the first clinical pastoral education program, at the state psychiatric hospital in the 1920's. Later the Rhode Island Council of Churches developed a program at the Rhode Island Hospital. Both programs were short-lived. However, in 1975 the dean of the Brown University Medical School, Stanley Aronson, MD, and The Reverend Charles Baldwin, Brown University Chaplain, were instrumental in developing the Interfaith Health Care Ministries program, which was incorporated in 1975.

Interfaith Health Care Ministries is accredited by both national organizations (ACPE and USCC), and incorporated by the interfaith religious community (Board of Rabbis, Diocese of Providence, and the Rhode Island State Council of Churches and member denominations). Sponsoring agencies include the Brown University Medical School, Miriam Hospital, Rhode Island Hospital, Women and Infants Hospital, Roger Williams General Hospital, Hospice Care of RI, Kent County Visiting Nurse Association,

Northwest Home Services, and the East Bay Mental Health Center.

Approximately 400 students, from a range of religious traditions, have completed the program. Most graduates serve in parishes and congregations, while others serve as chaplains in hospitals, hospices, nursing homes, and other health and human service agencies.

Those wanting to be certified as hospital chaplains must complete at least one year of clinical pastoral education. National chaplain certifying bodies include the College of Chaplains, National Association of Catholic Chaplains, and the Jewish Chaplains Association.

Role of Chaplains in Health Care

The role of clergy in health care is to bring the resources of the interfaith religious community to the suffering individual, family, staff and agency. Health care agencies include hospitals, hospices, home care agencies, rehabilitation centers, mental health centers, and convalescent centers.

Chaplains bring to the hospital milieu a unique theological perspective on the human condition. The chaplain's theological and professional education centers on the importance of listening to patient stories, developing relationships between human beings, encouraging a relationship with a higher power, and articulating ethical principles. This preparation differs greatly from physicians learning about science and technology in caring for patients.

A patient was comatose; a code was called. The medical team came quickly, with machines and medications. The chaplain, who knew the patient, moved to the head of the bed and started humming a tune in the patient's ear. After a brief time the patient started humming with the chaplain. The team looked startled. Later one of the physicians asked the chaplain why he had started humming. The chaplain replied that through visits with the patient he had learned about the patient's religious faith and love for religious music. The chaplain had been humming the patient's favorite hymn. The physician commented, "you know the patient in different ways than we do." This story, while unusual, highlights the different perspective the chaplain brings to understanding the patient.

The role of clergy can be defined as bringing the resources of the interfaith religious community to the suffering individual, family, staff and agency.

Chaplains are most helpful to patients and families when they listen to the spiritual issues raised by individuals living with illness. For example, cancer patients often ask: why me? why now? or what next? Individuals with spiritual faith may struggle with anxiety about what they did wrong to bring on the illness. Individuals without faith may experience anxiety about how to face the unknown with hope. Chaplains may simply listen empathically to the patient share questions or struggles or may add perspectives for patients to consider. In no case do chaplains use the conversations to convert patients to a particular view. Nor do chaplains seek to answer questions. Instead, chaplains hear the anguish most often expressed in the questions.

Chaplains approach patients and families wholistically. This means understanding the spiritual, mental, and physical aspects of health and illness. Chaplains learn medical terms and concepts, not to practice medicine, but to integrate pastoral care into a treatment plan. In addition, chaplains understand the social and psychological aspects of illness. It is important for clergy to understand whether a person is accepting his/her condition and planning realistically for the future, or whether the person is in denial and not facing reality.

Andy was diagnosed with terminal cancer. Early in the day Andy's physician had suggested the hospice program; yet hours later, in conversation with the chaplain, Andy talked about resuming his normal everyday activities. He seemed not to have heard the seriousness of his condition. The chaplain did not remonstrate; yet the chaplain told the physician and the nurse about Andy's view of his illness. After consultation it was decided that the physician would ask Andy to repeat his understanding of his condition so the physician could help Andy hear the diagnosis. The chaplain would continue visiting with Andy, helping him accept the prognosis and plan for his limited future.

Chaplain participation as a team member with the physician, nurse, social worker, and other caregivers is paramount. Only through the exchange of information and ideas can chaplains effectively minister with the patient and family as part of a team effort. When this does not occur confusion may result.

The physician told Mary that she would be going to a continuing care facility for rehabilitation. Mary disliked this option. She convinced the chaplain she could succeed at home if she had help from parish volunteers. The chaplain arranged with Mary's clergy for help. Meanwhile the social worker arranged for Mary to go to a continuing care center. When the social worker told Mary of the arrangements at the center, Mary told the social worker that the chaplain had arranged for her to go home. The social worker met with the chaplain and con-

vinced him that Mary needed rehabilitation in a center. Finally the chaplain was persuaded that Mary was not ready to go home. The social worker and chaplain met with Mary to convince her to go to the center. Mary, upset, felt betrayed by the chaplain and manipulated by the social worker and physician. Better communication and teamwork would have prevented this conflict.

To be effective in the hospital, the chaplain must have a clear pastoral identity which enables the staff, patients, and families to experience the chaplain as a competent representative of the religious community. Pastoral identity means chaplains have a clear idea of who they are and what they can and cannot provide in helping relationships. The chaplain who is not clear risks giving uninformed medical advice or independent discharge planning.

Specific Services Offered by Chaplains

Chaplains in health care provide patients and families with a variety of pastoral services, including pastoral visits about matters important to the patient; prayers and religious readings; religious rituals; ethical perspectives; and referral to area clergy.

Chaplains contribute to risk management in subtle and undocumented ways. Patients and families may experience anger and discontent while receiving care in hospitals. Hospitalization is stressful. Through empathic listening to patients and families as they express anger and frustration, chaplains help resolve difficulties which could end up in courtrooms. In one hospital the chaplaincy team and the risk management team work closely to resolve patient concerns and complaints.

Chaplains provide staff support. Chaplains, considered good listeners, are safe and trustworthy members of the team. Staff often feel safe speaking about questionable patient care, unsatisfactory interactions with other team members, and ethical qualms about treatment regimens. Through discussion with the chaplain, staff members can air concerns which could impair their work. Sometimes these concerns are resolved through the discussion; sometimes other actions are required. Also, staff discuss their own personal/family difficulties with chaplains. Often these crisis intervention visits enable the person to gain a perspective on how they can best respond to those difficulties and separate them from their work.

Chaplains are involved in educational programs both through staff in-service programs and through professional educational programs for medical students, nursing students, etc.

At one center the chaplain was part of an interdisciplinary team providing seminars for staff on loss and grief. The seminar helped staff respond better to patients experiencing loss of home and job through their hospitalization and to persons facing death.

Also, chaplains serve on both ethics and institutional review committees. Chaplains share their views as ethical issues are raised regarding the use of human subjects in research or treatment options in complicated cases. In one committee discussion the question was whether to give patients in their last months of life an experimental drug which had nausea as a side effect. The researcher argued that the risks and discomforts to present patients were worth the development of the drug for future patients. The chaplain argued that it was inhumane to give patients a drug that would complicate life in their last days. The discussion enabled the committee to consider opposing views and make an informed decision.

Chaplains provide a vital link between the hospital and the community. Most chaplains are active in religious communities and other agencies serving the community. Through these contacts important networking is established which has both a service and public relations advantage for the hospital.

New Challenges and Opportunities

As health care changes, chaplains face new challenges and opportunities. Joint Commission standards call for assessment of patient cultural, ethical, and spiritual concerns in treatment and discharge planning. At one hospital the chaplains serve as consultants to the nursing staff in making such assessments. Depending on the evaluation the chaplain may or may not become directly involved with the patient.

With shortened hospital stays, more patients recover at home. Visiting nurses and rehabilitation staff give home care. However, except for hospice programs, traditional home care programs do not focus on emotional and spiritual support. In home care hospice programs chaplains visit with the family as part of the team's assessment of their needs and how resources can best be offered. If the patient and staff agree that chaplain visits should be part of the treatment program these are available. It is common for homebound patients to request chaplain home visits to discuss spiritual and emotional concerns.

Outside hospice, chaplain visits with home care patients are uncommon, but important. This is a new

frontier for home care agencies. Some patients may have contact with a local congregation and the pastor or laypeople may offer spiritual support. However, many elderly persons, disabled individuals, and those with chronic illness lack such support, since they have not been able to attend regular services and meetings. Homebound patients are probably the largest at-risk group and the one most needing home visits from chaplains.

Research in pastoral care and the role of spirituality in health care has increased in recent years. Researchers, including physicians and clergy, have discovered the importance of spiritual support in recovering from an illness or accident, living with a chronic illness, and preparing for death. These studies contribute to a growing body of literature demonstrating the validity of including both physical and spiritual concerns in the diagnosis and treatment of patients.

The financing of chaplaincy programs is problematic. Traditional programs are funded by hospitals, hospices, and home care agencies. Medicare reimbursement is available to nationally accredited clinical pastoral education programs in hospitals, but not for chaplaincy services. Some hospitals fund chaplaincy services as administrative costs. Others seek funding through hospital and other foundations and/or development programs. Sometimes the religious community contributes to the cost.

Like most programs in the health care system, chaplaincy programs are under careful review as to their effectiveness in meeting goals for prevention as well as treatment. This is particularly true as hospital stays shorten and out-patient and home care services grow. One of the main contributions chaplains can provide is to develop interfaith caring networks for individuals and families needing spiritual support in the hospital and in the home.

Rev. Duane Parker, PhD, is an ordained minister in the Methodist Church and is Executive Director of Interfaith Health Care Ministries, based in Rhode Island hospitals and providing chaplaincy services for local hospitals, hospices, visiting nurses associations, and community mental health clinics.

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Religious Healing

Rabbi Michael Z. Cahana

The Power of Ritual

He was a young man whose body seemed to have given up on him. The list of complaints was long, and somewhat incoherent. How did they interrelate? How did it all begin? What was really going on with him? As a hospital chaplain, I could only sit and listen. I felt so ineffectual. What good was my presence? What peace or comfort could I provide as the tears streamed down his face?

I have faced many moments of doubt before and since, but this young man stays with me. Not for anything that I did, but for the opportunity I had to witness the power of religious ritual in healing.

I was a rabbinic student serving a summer chaplaincy at New York Hospital in Manhattan. Although my primary responsibility was meeting with Jewish patients, I spent many hours with people of various faiths who had requested a chaplain. Many sought the comfort of a person with patience who had no medical opinion to offer and no rounds to make. Sometimes they would ask theological questions; more often they would simply talk.

This young man in the last room on the 14th floor became a regular stop for me. Like many patients he would show me the wounds and scars that his body had become. Like many patients, he had come to see himself as his illness. My job was to help find the person beneath the symptoms, to separate the man from the disease - to let him talk about his estranged son as well as his colostomy bag. If I had an agenda, it was to help him see that even his rebelling body was created in the image of God.

He was a deeply religious man, but not of my faith. A Jewish chaplain discoursing with a devout Catholic, I at times felt an oddness about our religious conversations. Although he seemed to appreciate our talks, I felt helpless — as though he were expecting something else from me. I had no medicine to offer his mutinous body and, apparently, no balm for his troubled soul.

Part of the student experience at this chaplaincy was exchanges with clergy of other faiths. In the trenches, as it were, strong bonds crossed denominations and religions. Among my comrades, I had formed a friendship with a young priest who was in Manhattan for a short stint. One day we agreed to follow each other on our visits to learn our varied approaches to the task of providing spiritual comfort and aiding healing. On this visit I learned the power of ritual.

... most doctors acknowledge a human need for spiritual healing that complements their own technical skills.

As we entered together the last room on the 14th floor, I saw a new look in the young man's eyes. He focused on the priest's collar and almost immediately the tears began to well up. Eschewing the normal opening lines I had always used when first walking into a patient's room, the priest almost immediately began a communion ritual. I was aghast! Where was the conversation? Where was the getting to know? Where was the awkward searching for the right thing to say that I had become so accustomed to?

But as the ritual, which to me was foreign and disconnected, continued, I saw peace come over the man. I saw his body become stronger. I saw him connected to his faith and accepted by a representative of his God. In that ritual moment I saw more healing than I had witnessed in our many long talks. In that moment, the man whom I had come to see as a complainer and lost soul became a human being deserving of caring and of love - a transformation that has stayed with me.

The Obligation to Heal: A Religious Duty

Religion and healing, faith and science are often falsely set up as dualities. The stereotypic "faith healer" sells promises, shunning reality. The heartless medical practitioner, the polar opposite, sees a patient as a disease-to-be-cured through calculated application of scientific principles.

Although these extremes exist, the truth for most of us is somewhere in the middle. Few clergy would proclaim faith alone as the cure for all a person's ills, and most doctors acknowledge a human need for spiritual healing that complements their own technical skills. Both recognize that the patient is a part of the process and not a machine which can be programmed with the appropriate physical or spiritual response.

Judaism in particular does not recognize the spirit/body duality often imposed on us. Judaism posits no separation of body and spirit, although there is a supposition of some form of eternality. The body is not a vessel for God's gift, but a part of that gift. Life itself is sacred and holy; to heal the body is a religious task.

The commandment to heal is based on two biblical sources, which reflect two complementary views on healing.

The first, from Deuteronomy, states simply: " ... and you shall restore it to him."[1] Although the verse refers to lost property, Moses Maimonides, himself a physician, interprets the words as a commandment

to other healers: "it is obligatory from the Torah (the five books of Moses) for the physician to heal the sick, and this is included in the explanation of the scriptural phrase 'and you shall restore it to him', meaning to heal his body."[2] In other words, healing is restoring the body back to its proper state. For the physician (of any faith), healing is a religious task using secular scientific tools. For the clergy person, it is a physical obligation using religious tools. Both use their gifts and training to restore a patient's lost health.

The second biblical source comes from the interpretation of a repetition: "And if men contend, and one smite the other with a stone, or with his fist, and he die not ... then shall he that smote him ... pay for the loss of his time and shall cause him to be thoroughly healed."[3] Again, on the surface the verse expounds civil law. But commentators have long focused on the final phrase "to be thoroughly healed." In Hebrew, the phrase is expressed through the repetition (in two grammatical forms) of the word for healing: *ve-rapo ye-rapae*. Through typical Rabbinic exegesis this repetition is interpreted to imply two components to healing: the physician and God. As many wonderfully skilled doctors have taught me, the physician does not heal; he or she creates the conditions that allow for healing.[4]

Allowing Healing

Judaism, like many religions, teaches that doctors are doing God's work by creating the physical conditions for healing. Doctors help to return what has been lost, to bring the body back to its proper state of being. The chaplain witnesses and participates in this healing, because to restore what was lost, one must understand what the human is and can be. The chaplain helps the patient to see him/ herself not as a person with a disease, but as a person who has been robbed. Not as someone who must accept the inevitable, but someone who must fight to preserve and enhance the greatest gift: life itself.

Of course there are inevitabilities. Death will come for us all; and before that most of us will be robbed of some functionality. But the partnership of the physician, the patient and the chaplain helps to make sense of the chaos. The ritual of communion did not heal the young man's body, but it helped him accept his pain as part of his present reality. It helped him connect his suffering to an ontological reality. I do not understand all the theological implications that communion had for this particular soul, but I do know that he felt embraced and loved by his religion and his God. Most importantly, he knew that he was not alone. His humanity had been recognized; his eternality had been reassured. Religiously, it is harder for me to promise my Jewish patients a post-mortal world. But I can assure them that they are not alone. I can help them see a partnership with their doctors and their religious life. I can help them create the conditions that allow for healing by letting them see themselves as lovingly created in the image of God, the ultimate Source of wholeness.

References:

1. Deuteronomy 22:2
2. Maimonides, Mishnah Commentary on N*edarim* 4:4
3. Exodus 21: 18-19
4. For more on the Jewish obligation to heal, see "The Physician's License to Heal," Fred Rosner, MD, *Modern Medicine and Jewish Ethics*, New York: Ktav for Yeshiva University, 1991.

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The Chaplain in a Psychiatric Facility

Rev. David F. Shire, MDiv

THE PRESENCE OF A CHAPLAIN IN A psychiatric hospital acknowledges the essential spiritual nature of each person and the power and support that faith and spirituality play in the healing process. Most patients enter a psychiatric hospital with at least two things: an illness, plus the inner resources that can aid in healing, including a faith system and personal spirituality that help integrate their lives and make sense out of their world.

The chaplain must provide an ecumenical and interfaith presence, beginning with and working from each patient's religious orientation and not his or her own. The chaplain is not present to convert or advocate, but rather to understand and support the patient's own beliefs, suggesting alternative views only when the patient is stuck in a harmful mind set. To be effective, a chaplain needs the visible support of the hospital administration and medical staff. With such support, the integration of the patient's spiritual dimensions into the treatment plan enhances the healing of the whole person: body, mind and spirit.

Whatever the relationship between religion and psychiatry was in years past, today the chaplain in a psychiatric hospital is part of a treatment team, and not the provider of a separate or alien discipline off doing its own thing. The Medical Director of Butler Hospital, Robert Westlake, MD, explains: "Although generally ignored by modern psychiatry, religion and spiritual issues play a significant role in the day-to-day life of most of our patients. It is unrealistic to consider that the importance of these issues would suddenly be forgotten when our patients are burdened by psychiatric illness. Shame, guilt, unexplained occurrences, anger and grieving are just a few of the many issues which often present with religious overtones. Psychiatrists, either because of discomfort or lack of concern, seldom seek out these issues, and patients often are reluctant to identify these concerns. In these circumstances, the Hospital Chaplain who understands the values, philosophy and treatment approach of the interdisciplinary psychiatric team is the ideal individual to help the patient bridge the two worlds of psychiatry and religion."

Abbreviations Used:

ADP	Alcohol and Drug Partial Hospital program
OCD	Obsessive Compulsive Disorder
CDP	Chemical Dependency Professional

The word "bridge" is key. One role of the chaplain in a psychiatric hospital is to help build the bridge and keep it in good repair. Because of the historic alienation between religion and psychiatry, that bridge must connect not only to the psychiatrists, but to other members of the health care team: nurses, social workers, mental health workers, occupational therapists, and the support staff. That bridge helps connect patients to their own spiritual resources. It links the chaplain to the patients and treatment team in a situation that is almost always filled with disconnection, confusion and anxiety: admission to a psychiatric hospital.

... today, the chaplain in a psychiatric hospital is part of a treatment team and not the provider of a separate or alien discipline off doing its own thing.

The team, of which the chaplain is one part, seeks to treat not only an illness but the whole person. Two and a half years ago, when I began at Butler Hospital, we had to discern how best to deliver such treatment with a chaplain on staff. Managed care affects the delivery of pastoral care services, just as it affects other aspects of a hospital stay.

In the 1950s and 1960s when I first trained in clinical pastoral education, and during most of my 35 years as a parish minister, we had two weeks to minister to most surgical patients, and many weeks, if not months, to minister to psychiatric patients. With managed care and modern pharmaceutical treatments, that has changed. We needed to design a pastoral care program for short hospital stays. Clearly, the chaplain could not visit every patient, nor would every patient want a visit. We designed a referral system which begins with patients' needs and desires. Each patient can self-refer to the chaplain, and many do. Any staff member can refer a patient to the chaplain with the patient's permission. The effectiveness of the system depends upon those "bridges." Patients must know the chaplain is available, and psychiatrists and other staff members must be able to discern spiritual issues and trust the chaplain's ability to work with patients. The bridge must connect everyone.

During the healing of patients, issues of meaning, grief, loss, guilt, faith and belief, noted by staff members, result in a referral to the chaplain. Literature describing hospital services and programs notes the availability of the chaplain. And signs posted in each unit give the chaplain's telephone extension.

The psychiatric hospital is not only a stressful place for patients - it is also alien territory for many clergy. We

encourage patients to invite their pastors to visit them To extend the bridge into the local parish, we invite community clergy to lead weekly ecumenical prayer services. We have a team of outstanding pastors who lead the prayer service and join patients and occupational therapy staff afterward in a social hour. My Roman Catholic colleague, Father Jude McGeough, leads these services every third week, and is available to patients as his parish duties permit.

In addition to the general psychiatric programs, there are two specific areas of treatment where the chaplain has proven an important resource: that of substance abuse, and the treatment of persons with obsessive compulsive disorder (OCD).

In alcohol and drug inpatient units and the partial hospital day program, we see spirituality and faith as essential to recovery. Alan Gordon, MD, Unit Chief of the Adult Day Program, notes: "Our treatment of alcoholism and other drug addictions is based on a model of cognitive therapy that helps individuals to pause and do a functional analysis of various aspects of their lives. The teachings of the AA Twelve Step Program, with its encouragement of self-reflection, humility and recognition of a 'higher power,' are interwoven into the fabric of the rehabilitation process. This is a time when most patients, often for the first time, pause and consider their own spirituality, their faith, and their role in relation to their universe. The chaplain, through weekly Spirituality and Recovery groups, helps patients formalize and organize these issues in a meaningful way. The approach is non-threatening, and allows the individual to consider concepts without feeling religion is being forced."

We suggest a separation between "religion" and "spirituality," with religion defined as the patient's own denomination and faith system, and spirituality as a personal connection to a Power greater than one's self, linking the individual to that Cosmic Force that causes the universe and us to be. This approach averts debate over past negative church experiences, and allows the patient to focus on the positive capacity for spiritual growth and understanding. Thomas H. Marland, RNC, CDP, developed the group which we co-lead in the Detox Unit; and Barbara Clarke-Parent, CDP, helped me refine the design of the Spirituality and Recovery Groups in the Adult Detox Program. This typifies the team effort that is essential for the success of pastoral care in a psychiatric hospital.

Steven Rasmussen, MD, Medical Director for Ambulatory Services, describes the chaplain's role in the treatment of patients with obsessive compulsive disorder: "The chaplain can play an instrumental role in guiding patients with psychiatric disorders back into a state of psychological and spiritual health. There is, perhaps, no disorder where this is more apparent than OCD. Many of these patients suffer from religious obsessions where they fear that unless they perform a specific ritual, such as saying the Lord's Prayer a certain number of times in a particular cadence, they have sinned... Interestingly, OCD is found across cultures in almost every religion... Many... religious figures have written about their battles with scrupulosity. Having an awareness of modern pharmacological and behavioral techniques may not be enough to treat patients with religious obsessions. There is evidence to suggest that hyper-moral or religious OCD patients are particularly difficult to treat. Many feel that the typical health professional fails to understand their personal relationship to God. Having a chaplain who is trained in cognitive behavioral treatments, and is capable of delving into the spiritual dimension with these patients as an authority figure or extension of God's hand, can often make the difference in treatment outcome."

* * *

The chaplain should also play a role at an institutional level. Butler Hospital invites the chaplain to serve on the Institutional Review Board, where all research projects are reviewed, and on the hospital's Ethics Committee.

Those long-standing barriers between psychiatry and religion are gradually breaking down. Outstanding practitioners and medical educators, especially the late Irving Rosen, MD, promoted greater understanding between the two disciplines. Dr. Rosen's Spiritual Issues Seminar, now under the leadership of Jon Wolston, MD, and annual lectures in Dr. Rosen's memory are continued reminders of the spiritual nature of each human being, and the interconnection and interdependence of spirituality and medicine.

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Tell It To the Chaplain

Rev. John E. Watterson

"Tell it to the Chaplain."

Most young soldiers hear this usually from a sergeant. It comes with a bit of irony, humor, futility and practicality. I was a chaplain for 27 years, and the soldiers "told it to me" for 27 years. They told their disappointments, pains, joys and their secret fears. They did it because they knew the chaplain, the chaplain knew them and the chaplain kept secrets.

Chaplains differ from parish clergy not so much by the types of ministry they perform as by the institutional setting in which they minister. Chaplains work in hospitals, the military, colleges, prisons, in factories, retirement homes and in police and fire departments. They are part of institutions which have well-defined roles and shared goals.

One story about the origin of the word chaplain describes Martin of Tours, a soldier. According to legend, one night he was on the road when he met a beggar freezing in the cold. Martin of Tours drew his sword and cut his cape in two. He gave part to the beggar. That night, in a dream, he saw the beggar again, but this time in his true identity as Jesus Christ. In the morning the cloak was whole. In years to come the miraculous cloak was kept in a small church named after the cloak - a capella. The word was applied to the building, a chapel, and later was used to identify the person responsible for the small church, the capellanus, the chaplain.

Chaplains identify with the people they serve by sharing their life and work environment - described in the Army as "getting your boots muddy." All institutions have similar entry rituals. In sharing the life, the hardships, the joy of people, the Chaplain earns their trust. Sharing creates an identity. The fact that all sorts of institutions have chaplains can startle people. One professor at Long Island University once asked us in a sociology class, "How do you bless a battleship?" "It's easy, but it takes all day," we replied.

The great reputation of military chaplains is earned in combat. What do they do in combat and what do they bring to the whole situation? They don't carry weapons, because of their special status from the Geneva Conventions. But if you ask combat commanders, almost to a man they will say they needed a chaplain. The code book has a number for the chaplain. In Viet Nam their nickname over the radio was "sky pilot." The Chaplain brings to the madness of combat a bit of conscience and awareness, a contact to home, church and society and a sense of forgiveness.

The Chaplain brings to the madness of combat a bit of conscience and awareness, a contact with home, church and society, and a sense of forgiveness.

A Bit of Civilization

Combat is brutalizing. Almost always the enemy is seen as sub-human, usually called a dehumanizing name: gooks, japs, slopes, dinks, krauts, etc. As the enemy becomes subhuman, he becomes expendable. Killing him becomes "no big thing." He gets "blown away," "zapped," "wasted." A hardness of heart, coupled with a suspension of self-awareness, is created that makes the reality of combat easier to endure. That hardness insulates you from the violence, your conscience, your actions and your responsibility. But it works havoc with your soul, your psyche and your mind. At one end of a continuum is the soldier who wantonly kills. At the other end is the soldier who pulls the trigger only after an intense, internal debate of conscience. Yet in combat, especially in a small unit and low intensity conflict, hesitation can cause your death. One of the hardest challenges for a chaplain is to preach and counsel against the dehumanization of the enemy - while encouraging soldiers to react quickly, violently and with lethal force to save their lives. The tension still exists.

I remember prisoners of war who recognized the cross on my uniform and made the sign to show that they too were Catholic. In Qui Nhon in 1968 we had a great choir at the Hospital Chapel. Practicing during the week in the hospital compound, they sang at the Sunday afternoon Mass. Yet they were prisoners of war. They came to Mass each Sunday with no guards and they mixed with our soldiers. Draftees from New England worshipped with those from Hanoi.

A Contact to Home

Many times worship in the wildest places is the only familiar thing around. A young soldier cannot admit he is scared or lonely, but in worship can find the space to connect with familiar rituals and hopefully find friends. Rituals make a life and culture, which may be far away, present. In the midst of the insanity of violence, worship and prayer are a bridge to a more familiar, comfortable and reassuring world. I served in Viet Nam with a young Jewish infantryman who wrote to the Jewish Welfare Board, asking for ten packages of special foods for Passover. I don't think they believed there were ten Jewish soldiers in one platoon, but the food arrived. And for a few days with the special foods of the holy days he was back home. Actually the food was better than C-Rations. I can

still remember the taste of the macaroons he gave me. I also recall a young machine-gunner at an impromptu memorial service on a small landing zone in the jungle. His friend had been killed a short time before. He asked me if I could say a prayer; then he would say a few words: "They can't take him away until we pray for him." We did pray, a small group gathered around the body bag. My prayer was short and forgettable, but not the eulogy or the eulogist. He was dirty, tired and barechested, with a machine gun cradled across his abdomen. His words were intense, punctuated with a combination of religious words and multiple variations of a well-known four-letter word. It was obscene, yet prayerful. We all cried. And the words healed the broken hearts of the soldiers gathered. We had prayed together, and it calmed our hearts and in a sense took us out of the jungle.

The Power of Forgiveness

I never met a soldier who has killed in combat and was completely untouched by the experience. Many times soldiers ask for forgiveness for doing their duty, even though their survival hinged on their doing their duty. A young medic newly arrived from the States came to Mass one afternoon in the jungle. On his first day in the field he was to go on a night ambush patrol. The next morning he sought me out to tell me that he had killed an enemy soldier in the middle of the night. The enemy was walking down a trail, most likely on way to join his unit. The ambushers quickly dragged the body off the trail and waited until first light. When they examined the dead soldier, they found he was a medic, carrying a pack on his back, full of medical equipment that he never had an opportunity to use. I sensed that a part of the young American medic also died when he killed his enemy. As we talked, I understood that he was not so much telling a story as asking forgiveness.

Since chaplains, wherever they work, minister to both the individuals and the institution, they learn a lot about other traditions. Many times it is the Chaplain who ensures that everyone's traditions are respected, enabling everyone to practice his/her religion. In military societies chaplains readily accept this responsibility to provide for free exercise.

Most Americans know the Constitution forbids government participation in the establishment of a religion. The "wall of separation" is probably the most famous piece of masonry in the nation. Most of us, however, forget what the Constitution says about "free exercise." Free exercise simply means that chaplains help provide all an opportunity to worship according to their tradition. A Methodist chaplain classmate of mine helped work out a compromise so Sikhs could serve and still practice their faith: Olive drab turbans and a picture of a knife (instead of the real thing) satisfied the soldiers and the institution. Occasionally you still see a turban under a helmet. Protective masks can be made to seal well around a beard, but no one believed it until an Orthodox Rabbi proved it. The Muslim soldiers of Vicenza, Italy, used to pray on small prayer rugs purchased (for a good price) in Northern Iraq with money donated by the Catholic community. Moslems can celebrate Ramadan because the Mess Hall makes food available before sunrise and after sunset - sort of breakfast-in-a-bag, an idea from federal prisons. And there was the time when a Division Commander wanted one big religious service on Easter Sunday at 6:00A.M. because small services would have interfered with battle, scheduled to start at 7:00 A.M. The soldiers were encouraged to come on their vehicles so they could quickly return to their battlefield positions. They did. Hundreds of them. It was a great success. It took hours to untangle the tangle of tanks. Battle began on Monday.

Chaplains get involved in people's lives. Maybe it's because they live a lot of the same life. Sharing of values and sharing of mission create a common bond. Generally chaplains are perceived as understanding the life, both successes and failures, of their people. Once in Walter Reed Hospital I sat for hours listening to a dying general describe the great allied leaders he worked with during World War II. He was there at the beginning of NATO and confidently predicted the Soviet Union would not last. Why? Because he knew well the men who led it. It was at Walter Reed that I first met AIDS. We didn't know much about it - and we were afraid. Each day I brought a mortally ill young man Communion. The head nurse made sure I wore every piece of protective garb that existed. She supervised the multiple washings of hands and arms after I finished my visit. And she checked me more thoroughly than my mother ever did before supper. The young man soon died. He never saw my face, and I never touched him in blessing without the barrier of a latex glove. Nor did he ever

understand what was happening to him, or why.

Chaplains often find it difficult to play the prophet, to criticize the system of which they are a very integral part. To be a prophet in a system upon which you depend for your livelihood is difficult and requires prophetic courage. Many times the truth is spoken not in words but in deeds which lead the institution where it should go. Chaplains in the army first spoke about race in the hollow army of the 70's. In those days Viet Nam was ripping the nation's soul apart. The Army was preoccupied in fighting the war at any cost. In many areas it forgot about its people. Racial prejudice and drugs were cancers growing deep in the center of the Army. Once a young black soldier complained that not one black soldier had been promoted in his company in two years. I introduced him to the unit's sergeant major, who not only saw to it that the black soldier was promoted but that the career of the officer who would not recommend black soldiers ended. But even as individuals were helped, the Army itself was wary of "Black Pride" and "Black Power." In 1971 at Hanau, Germany, the chaplains held a memorial service for Dr. Martin Luther King over noontime, so no one would miss work. In the small chapel, filled with over 250 soldiers, there were no white faces and no officers. The senior officers called later, asking, "How did it go?" That afternoon the interracial council met in the chapel. They started with issues like black hair care products and rapidly progressed to less visible but more important issues. Today the services are widely considered a place of true openness. Just recently I read that the Chief of Staff of the Army wondered if they hadn't "downsized the chaplaincy too far:" maybe the abuse of female soldiers at Aberdeen would have surfaced sooner if there had been more chaplains available for the young soldiers to talk to. Perhaps this gentle way of showing an institution how to remain true to its values is a form of prophecy. It is not always easy to defend values, but it is possible with hard work and gentle persuasion to change an institution.

While not stridently denominational, chaplains remain true to their religious traditions. To be a chaplain is to respect others and to understand them. Chaplains are at times removed from the comfort of their church and its familiar ways. But the chaplain always knows people who are alone and cold. And often the chaplain is the only one there to share half a cloak to keep them warm.

Rev. John E. Watterson is a retired Army Chaplain. He is pastor of Saint Mary's Church, Pawtucket, and Director of Health Care Ministries for the Diocese of Providence.

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The Creative Clinician: Case of the Month

The practice of medicine is an art, not a trade; a calling, not a business ..." – William Osler, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

A Lump in the Throat Follows a Pain in the Neck: A Teenager with a Nasopharyngeal Mass Following Infectious Mononucleosis

Anthony Mega, MD

A 19 YEAR-OLD FEMALE COLLEGE STUDENT developed persistent nasal congestion five months after recovering from serologically-documented infectious mononucleosis. She did not seek medical attention for the congestion, but only when, after 2 months, she found a "fullness" in her left neck. Her symptoms: nasal congestion, left facial discomfort, and odynophagia.

Her history was remarkable only for a tonsillectomy at age 10. She had smoked 1/2 pack of cigarettes per day, but quit 2 months prior to presentation. She did not complain of fevers, chills, night sweats or weight loss. Physical examination showed a large soft tissue mass extending from the nasopharynx, displacing the soft palate inferomedially. A firm multilobulate mass, 5 cm. by 6 cm., extended from the left angle of the mandible to the mid-cervical lymph node chain. Otherwise, her physical exam was normal.

This month marks the inauguration of The Creative Clinician: Case of the Month, *which will cast a spotlight on a patient whose case defies cookbook diagnosis or treatment.*

A representative section of a CT scan (Figure 1) showed a homogeneous, left nasopharyngeal mass causing displacement and compression of the oropharyngeal airway. Two separate masses in the left submandibular region (Figure 2) were gallium avid.

Plausible Diagnoses

The differential diagnosis focused on possible etiologies of nasopharyngeal masses and associated lymphadenopathy.

We wondered whether this metastasis was a primary tumor of the nasopharynx with lymph node involvement. The association of nasopharyngeal carcinoma with Epstein Barr virus (EBV) is universal, uniform, and, given the patient's mononucleosis, plausible. However, the patient did not fit the epidemiologic profile for nasopharyngeal carcinoma, a malignancy endemic to Southern China and North Africa, but rare elsewhere (in spite of its link to the ubiquitous EBV). In those regions, the carcinoma may be associated with a diet high in salt-cured foods, which release volatile nitrosamines when cooked. In addition, the peak incidence of the disease occurs in the fifth decade, and more commonly in males. If the patient's masses were due to neoplasm, a lymphoproliferative disorder would be more likely.

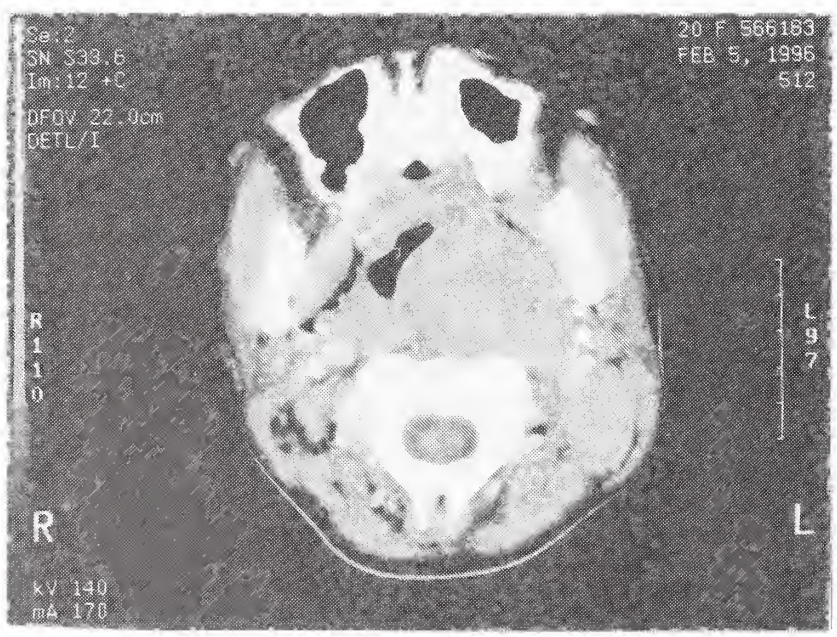

Figure 1

We speculated about infections. Mycobacterial infections could cause painless adenopathy and perhaps a nasopharyngeal mass. The patient did not have any risk factors for mycobacterial infections (tuberculosis exposure, ingestion of unpasteurized milk, high risk behavior for HIV infection): an opportunistic infection was unlikely. Nevertheless, we explored it.

The Diagnosis

The patient underwent biopsies of the nasopharyngeal and submandibular masses. Sections revealed a cellular tissue with dense fibrous bands along the outer margins, as well as atypical cells of the Reed-Sternberg and Hodgkin's type. Immunohistochemical staining proved that these cells were positive for CD 15 and CD 30, characteristic of Hodgkin's Disease (HD). The cells were negative for the EBV latent membrane protein (LMP-1).

Figure 2

The diagnosis: Hodgkin's disease, unclassified

Staging, which included CT scans and bone marrow evaluation but not laparotomy, revealed no further disease; thus she was staged as IIAE. Her HIV antibody test was negative.

HD is a solid lymphoid neoplasm that can originate in the lymph nodes or in extranodal sites. Its incidence is 30 cases per one million U.S. population. Unlike non-Hodgkin's lymphoma (NHL), incidence does not rise progressively with age. Instead, it peaks between age 20-30, and after age 55, when incidence rises steadily until age 80.[1]

This peculiar bimodality in age-specific incidence has spurred investigators to search for a specific, infectious etiologic agent. This bimodal pattern resembles that seen with chronic infections, like tuberculosis, or slow viruses, which demonstrate lengthy latency periods. The EBV is a highly prevalent agent with a prolonged latency. In the 1970's a 30-year restrospective review suggested an increased incidence of HD in patients who had had infectious mononucleosis.[2] Later reports refuted this claim, but advancing technology has re-opened the discussion.

LMP-1 is the protein product of the EBV encoded oncogene. The LMP-1 encoding has been demonstrated to cause aggressive growth in *in-vitro* HD cell lines. Its presence is also associated with a more aggressive HD subtype. The immuno-histochemical staining for LMP-1 was negative. In this patient the highly sensitive polymerase chain reaction was not done. The etiology of HD in this case, and in general, remains an enigma.

Extranodal involvement of HD occurs frequently in the spleen, liver, and bone marrow. Involvement of other extranodal sites is uncommon. If found, careful exclusion of NHL, which may resemble HD, should take place. The nasopharynx extends from the posterior border of the nose anteriorly, to the junction of the oropharynx posteriorly. Inferiorly it is bounded by the soft palate; superiorly, by the base of the skull. The nasopharynx consists primarily of squamous epithelial tissue richly infiltrated by lymphoid tissue, and evolves embryologically in conjunction with Waldeyer's ring. Lymphoproliferative neoplasms have been reported at this site, but rarely HD. Review of the past 20 years' literature yielded only 4 case reports of nasopharyngeal Hodgkin's disease.[3-5] The morphologic characteristics of this patient's mass represented HD, and the immunohistochemical staining gave irrefutable supporting evidence. The subtype was most likely nodular sclerosis, but the fibrous bands surrounded rather than permeated the cellular tissue; thus it was subtyped as unclassified.

Treatment

This young woman was treated with 5 cycles of systemic combination chemotherapy with doxorubicin, bleomycin, vinblastine and dacarbazine. She attained complete remission after two cycles. After completing chemotherapy, she underwent consolidative radiation therapy to the sites of her previous bulk disease. It has been 6 months since the end of therapy; she remains in complete remission.

References

1. Jandh JE, ed. *Blood.* Boston: Little, Brown and Co, 1996.
2. Reynolds D, Banks P, Gulley M. New characterization of infectious mononucleosis and a pheotypic comparison with Hodgkin's disease. *AJP* 1995;146:379-88.
3. Krzeski-Macinowska I. Neopharynx as a rare site of the first symptom of Hodgkin's disease. *Otolaryngologia Polska* 1990;44:321-2.
4. Strutz J, Zollner C, Wannemacher M, Mann W. A rare nasopharyngeal tumor: Hodgkin's disease. *Laryngologie, Rhinologie, Otologie* 1988;67:38-40.
5. Haubold-Reuter B, Potter R. Nasopharyngeal involvement of Hodgkin's disease - its diagnosis by CT and MRI. A Case Report. *Strahlentherepie and Ontologie* 1990;166:275-8.

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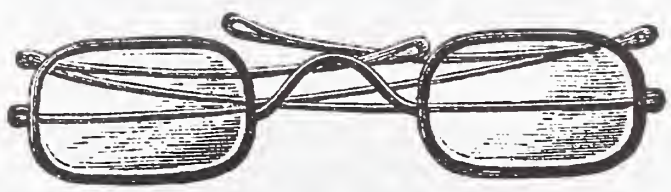
If you have a complex, surprising case that you would like to share, please contact Dr. Mega.



Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Firearms Injuries, 1991–1995

Jay S. Buechner, PhD

During the period 1991-1995, 269 Rhode Island residents died from injuries caused by firearms (26% of all injury deaths) and 430 persons were discharged from Rhode Island hospitals with non-fatal, but presumably severe, firearms injuries (1% of all discharges with injuries). These injuries include those resulting from homicidal intent, those resulting from suicidal intent, those that were unintentional, and those where intent could not be determined. Taken together, they indicate the magnitude of the impact that firearms have on the population of Rhode Island.

Methods.

Deaths from firearms were identified from death certificates of Rhode Island residents during the period 1991 through 1995, selected on the basis of underlying cause of death codes. Data for 1994 and 1995 are provisional, as certificates of Rhode Island residents dying out of state are not yet available. Hospitalizations for firearms injuries were identified from the hospital discharge abstract data submitted to the Department of Health by the state's 11 acute care hospitals for the period 1991 - 1995. Firearms injuries were selected on the basis of external cause of injury codes, and patients discharged dead were excluded so that deaths would not be counted in both analyses.

Results.

Over the five-year period, the number of firearms deaths per year varied between 47 and 61, with no clear trend. (Figure 1) The number of hospitalizations for non-fatal firearms injuries increased from 76 in 1991 to 92 in 1995. For both measures taken together, the peak number of occurrences was observed in 1995 and was 9.4% above the five-year average.

Fatal and non-fatal firearms injuries differed substantially in terms of the intent associated with the injuries. Fatalities were dominated by suicides (55%) and homicides (42%), with few unintentional injury deaths. (Figure 2) Non-fatal injuries consisted primarily of unintentional injuries (43%) and assaults (38%). Many more non-fatal injuries were categorized as being of undetermined intent than were fatal injuries. (This last divergence is largely a result of different data collection processes: Cause of death for most injury victims in Rhode Island is provided to the Office of Vital Records by the State Medical Examiners after substantial investigation, whereas cause of injury for patients hospitalized with injuries is abstracted from whatever information is included in the medical record.)

The demographic characteristics of victims of fatal and non-fatal firearms injuries are similar in

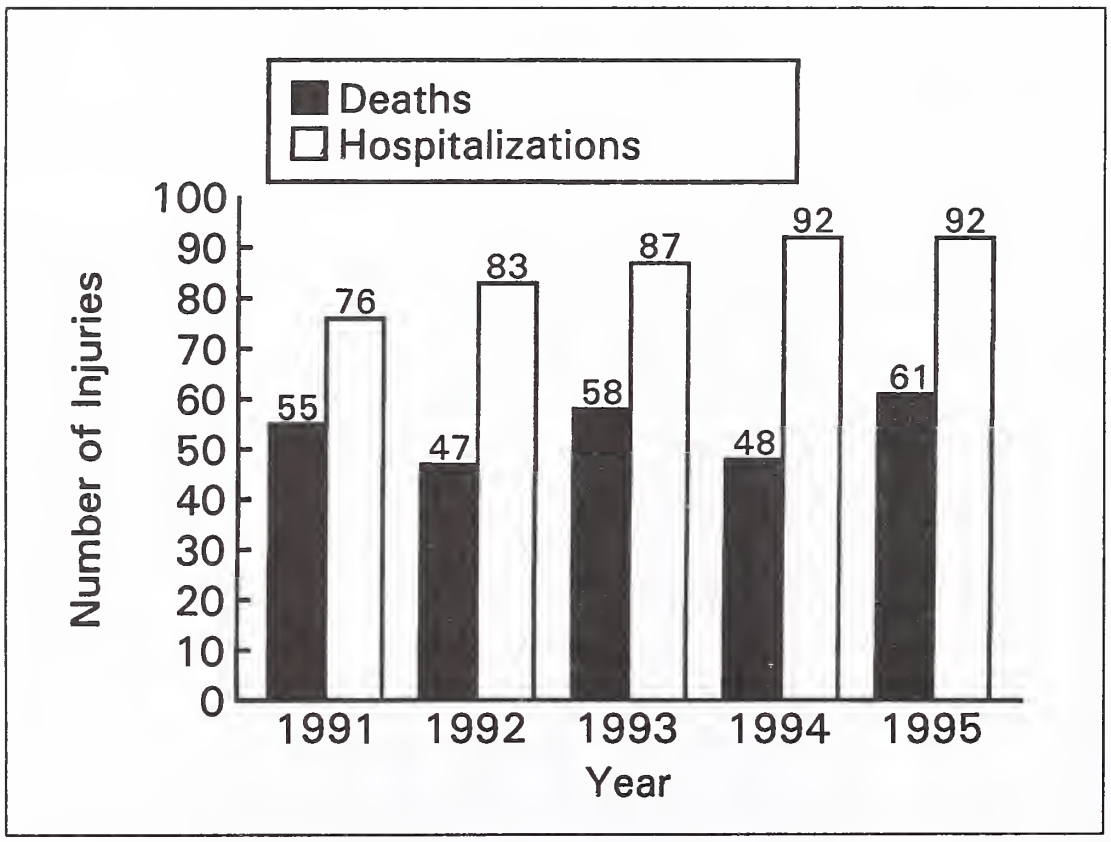


Figure 1. Deaths from Firearms Injuries and Hospitalizations with Firearms Injuries, by Year, Rhode Island, 1991-1995.

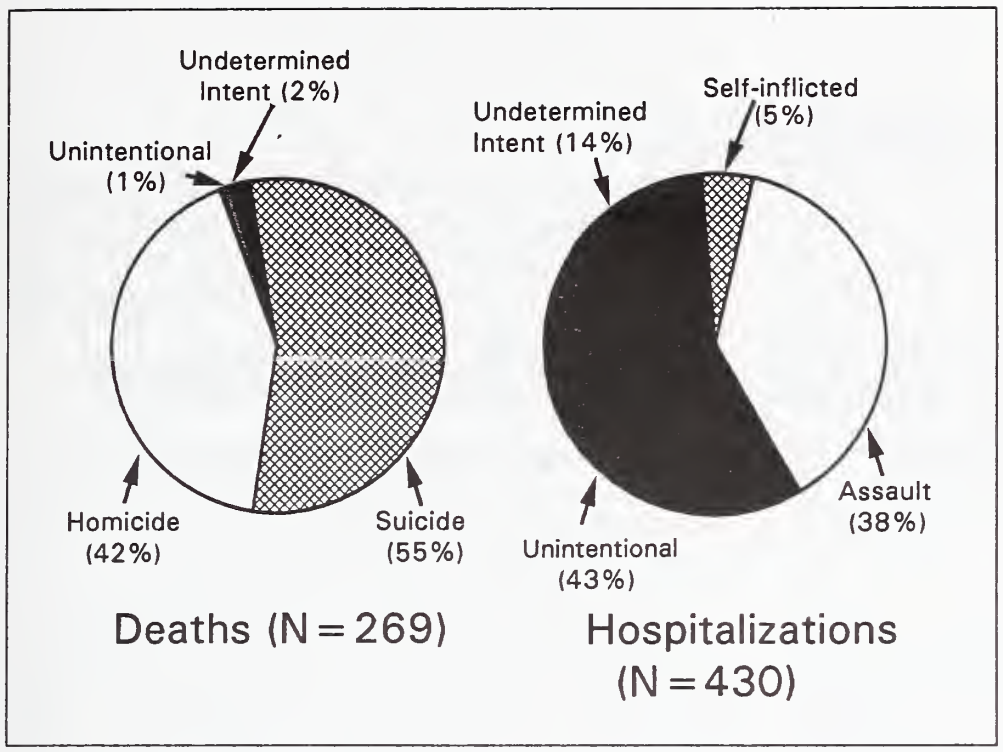


Figure 2. Deaths from Firearms Injuries and Hospitalizations with Firearms Injuries, Rhode Island, 1991-1995: Distribution by Intent to Injure.

some respects. Both kinds of injuries were much more likely to be sustained by males (89% of deaths and 90% of hospitalizations). A majority of victims in both cases were between 15 and 34 years of age. However, 30% of firearms deaths were of persons age 45 or older, compared to only 5% of hospitalizations. The higher percentage of firearms deaths among older adults is due to the high numbers of suicides by firearms among this group.

Victims of fatal and non-fatal firearms injuries differ in their composition by race and ethnicity. (Figure 3) The large majority of fatal firearms injuries occur to white, non-Hispanic persons, with smaller proportions of Hispanic and black persons among victims. Among persons sustaining non-fatal injuries, there are many fewer non-Hispanic whites and relatively more black and Hispanic persons.

Codes for underlying cause of death and for external cause of injury provide information on the type of firearm causing the injury: handgun, shotgun, hunting rifle, military firearm, and other or unspecified firearm. Unfortunately, in nearly all firearms deaths (89%) and in a majority of non-fatal firearms injuries (52%), the type of firearm is not specified. Among the non-fatal injuries for which type of firearm is specified, the large majority (80%) were handguns.

Discussion

Injuries from firearms, both fatal and non-fatal, are a persistent public health problem among Rhode Island's population. A high proportion of firearms injuries result in fatalities; these weapons are designed to be lethal. The incidence of injury is highest among young men, so that firearms injuries contribute substantially to both premature mortality and long-term disability. The prevention of firearms injuries must address both unintentional and intentional injuries, including self-inflicted injuries and injuries inflicted on others. In addition to criminal justice solutions, public health methods need to be employed, among them early identification and treatment of mental illness, restricting sccess to firearms, promoting safety devices that prevent accidental discharge of handguns, and prevention and treatment of substance abuse.[1] Without intensified efforts, firearms injuries will likely continue to occur unabated in our population.

References

1. Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* Washington, D.C.: US Department of Health and Human Services (DHHS Pub. No. (PHS) 91-50212), September 1990. pp 210-211, 233-237, 272, 284.

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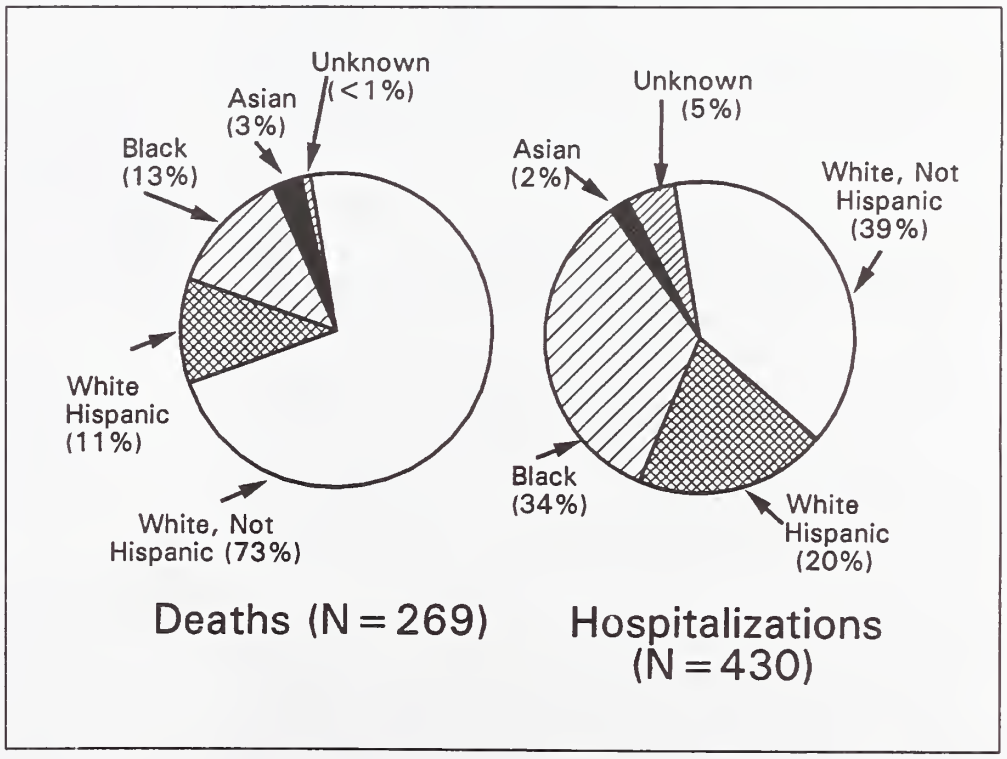

Figure 3. Deaths from Firearms Injuries and Hospitalizations with Firearms Injuries, Rhode Island, 1991-1995: Distribution by Race and Ethnicity.

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

The ACOS, QA, and the Burden of Cancer

Dorothy Darcy, AS, CTR, Frank Schaberg, Jr., MD, and John P. Fulton, PhD

Reducing Cancer Mortality with State-of-the-Art Cancer Therapy

In 1986, the National Cancer Institute (NCI) published *Cancer Control Objectives for the Nation: 1985-2000.* [1] The NCI made a convincing case for the widespread adoption of state-of-the-art cancer therapy, arguing that doing so would reduce the overall cancer mortality rate in the U.S. by 26%. In comparison, it was estimated that universal adoption of proven cancer screening tests, including the mammogram, clinical breast exam, and the Pap test, would reduce the overall cancer mortality rate in the U.S. by only 3%.

Two Approaches

The NCI suggested a variety of strategies to promote state-of-the-art cancer therapy. Two key strategies were adapted and incorporated into Rhode Island's official cancer control plan, published in 1989.[2] First, the plan recommended enrollment of eligible patients in approved clinical trials, reasoning that all major advances in the treatment of cancer in the last two decades have been the result of randomized prospective controlled studies. The population of Rhode Island has benefited greatly from these studies. Second, the plan recommended voluntary adoption of American College of Surgeons' (ACOS) approved cancer programs at all acute care hospitals in the State, reasoning that a coordinated collaborative approach to clinical cancer care with multidisciplinary input prior to the initiation of care would optimize treatment for our cancer patients. Although both strategies are important, *the second has greater significance for reducing the burden of cancer, because it has universal impact on the thousands of cancer patients in Rhode Island.* The first affects only a few hundred patients who may be eligible for clinical trials at any one time.

Progress since 1989

In the intervening years, both recommendations have guided the development of cancer control policy in Rhode Island. At the request of a state senator and a group of concerned constituents, the Rhode Island General Assembly established a commission to study the reimbursement of experimental cancer treatment programs by third party health insurers. Eventually, the work of the commission resulted in a 1993 law which guaranteed health insurance coverage for experimental cancer treatment as part of phase III and phase IV clinical trials. More recently, a number of acute care hospitals have moved to establish ACOS approved cancer programs. In 1989, when the cancer control plan was published, 6 of 11 private, acute care hospitals in the State (excluding the VA Hospital and the Naval Hospital) had approved programs. Currently, the remaining 5 are positioning themselves for approval. *It is key for the quality of cancer therapy in Rhode Island that this process continues until all private, acute care hospitals in the State achieve ACOS approval.*

The ACOS and QA

The purpose of an ACOS approved cancer program is to assure "that the atmosphere and organization exist within the institution to offer optimal care to the patient with cancer." The essence of an ACOS approved cancer program is active quality assurance, based on four program components: a multidisciplinary cancer committee, multidisciplinary cancer conferences, patient care studies, and a cancer registry. Each has a unique role to play in assuring the quality of cancer therapy in an institution.

- The multidisciplinary cancer committee provides leadership to the overall program. They maintain the vision of "optimal care to the patient with cancer," advocating for improved cancer care through quality assurance (including assessment, intervention, and evaluation).
- Multidisciplinary cancer conferences are held weekly or monthly, depending on caseload, to remove barriers to coordinated care. Physicians, nurses, social workers, the hospital tumor registrar, and other professionals attend the conferences, examining approaches to cancer therapy for those cancers seen in the institution, and discussing individual cases.

- Two patient care evaluations are performed annually, to assess approaches to cancer therapy in the institution, and to recommend improvements. Topics for evaluation are selected by the cancer committee, based upon the quality-of-care priorities it has identified. A cancer program may elect to participate in national cancer studies run by the Commission on Cancer, an organization established by the American College of Surgeons and expanded to include members from more than 30 professional associations in the United States.
- A tumor registry is established and maintained to track all cases of cancer diagnosed or treated in the institution. The registry provides quantitative information on disease, patient demographics, components of therapy, and survival.

The Tumor Registry: Key Quality Assurance (QA) Tool

The tumor registry is the key quality assurance tool used by the cancer committee to perform quantitative evaluations of cancer diagnosis and therapy. Its purpose is to track all tumors from the date of diagnosis to the date of death (from any cause). Data from the tumor registry may be used to describe caseload, disease type and severity, the selection and coordination of therapies, patient status, and survival. The registry may also be used to track patients, assuring that follow-up treatments and examinations are performed on schedule, and that overall continuity of care is preserved.

Maintaining a tumor registry is a labor intensive task, even when modern computers are used to input, aggregate, and analyze data, and comprises the main cost of ACOS approval. Establishing an effective tumor registry is usually the main stumbling block to implementing an approved cancer program.

Statewide Registry Support

Realizing the importance of tumor registries in hospital cancer program approval, the Hospital Association of Rhode Island (HARI) offers basic support for hospital tumor registries. Currently, 9 of 11 private, acute care hospitals in the State are enrolled in HARI's Cancer Information System (CIS), from which they receive:

- Ongoing training and consultation for tumor registrars,
- Assistance with the complete, accurate collection of all data elements,
- Assistance with patient follow-up,
- Computerized death certificate searches, crucial to the efficient maintenance of adequate patient follow-up rates,
- Regional data aggregates against which a hospital's data may be compared, and
- Consultation on computerized registry operations.

The Rhode Island Department of Health, in close collaboration with HARI's CIS, also supports hospital tumor registries through a statewide cancer registry established by the Rhode Island General Assembly in 1985. The Rhode Island Cancer Registry (RICR) performs regular evaluations of the completeness and accuracy of hospital tumor registry data, provides tumor registry software to all acute care hospitals in Rhode Island, and produces official cancer incidence and mortality rates for the State.

Physician Support

Physician support is key to the existence of voluntary ACOS approved cancer programs. Programs begin with physician concern for the quality of cancer therapy. Physician advocacy drives program development and maintenance. Physicians specializing in cancer therapy form the nucleus of the cancer committee. Their belief in a multidisciplinary approach to cancer therapy is essential to the success of multidisciplinary cancer conferences. Physicians from all disciplines are asked to report periodic information on patient status to the tumor registry.

Physicians in Rhode Island are urged to support the development and maintenance of approved cancer programs at their hospitals. The ACOS approach to optimizing the quality of cancer therapy is voluntary, practical, and effective. It was developed by physicians and is respectful of their traditional and fundamental role in cancer therapy, while promoting a useful, widely accepted multidisciplinary approach to cancer therapy, its assessment, and improvement.

Physicians are not alone in this endeavor. The Hospital Association has developed effective support for tumor registries and stands ready to advise cancer committees on the collection and use of effective quality assurance data. The Hospital Association has also developed a successful collaboration with the Department of Health on the Rhode Island Cancer Registry, thereby creating effective linkages to additional technical resources. Assuring state-of-the-art cancer therapy for all cancer patients in Rhode Island is achieveable. Let's do it.

References

1. National Cancer Institute. *Cancer control objectives for the nation: 1985-2000.* NCI Monographs. Number 2. Bethesda, Maryland: National Cancer Institute, 1986.
2. Rhode Island Department of Health. *Cancer control Rhode Island. Plan for 1990-1992.* Providence, Rhode Island: Rhode Island Department of Health, 1989.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	October 1996	12 Months Ending with October 1996	
	Number	Number	Rates
Live Births	1,090	13,728	13.9*
Deaths	820	9,531	9.6*
Infant Deaths	(11)	(86)	6.3#
Neonatal deaths	(10)	(65)	4.7#
Marriages	883	7,882	8.0*
Divorces	304	3,343	3.4*
Induced Terminations	429	5,424	395.1#
Spontaneous Fetal Deaths	68	1,003	73.1#
Under 20 weeks gestation	(60)	(948)	69.1#
20+ weeks gestation	(8)	(55)	4.0#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

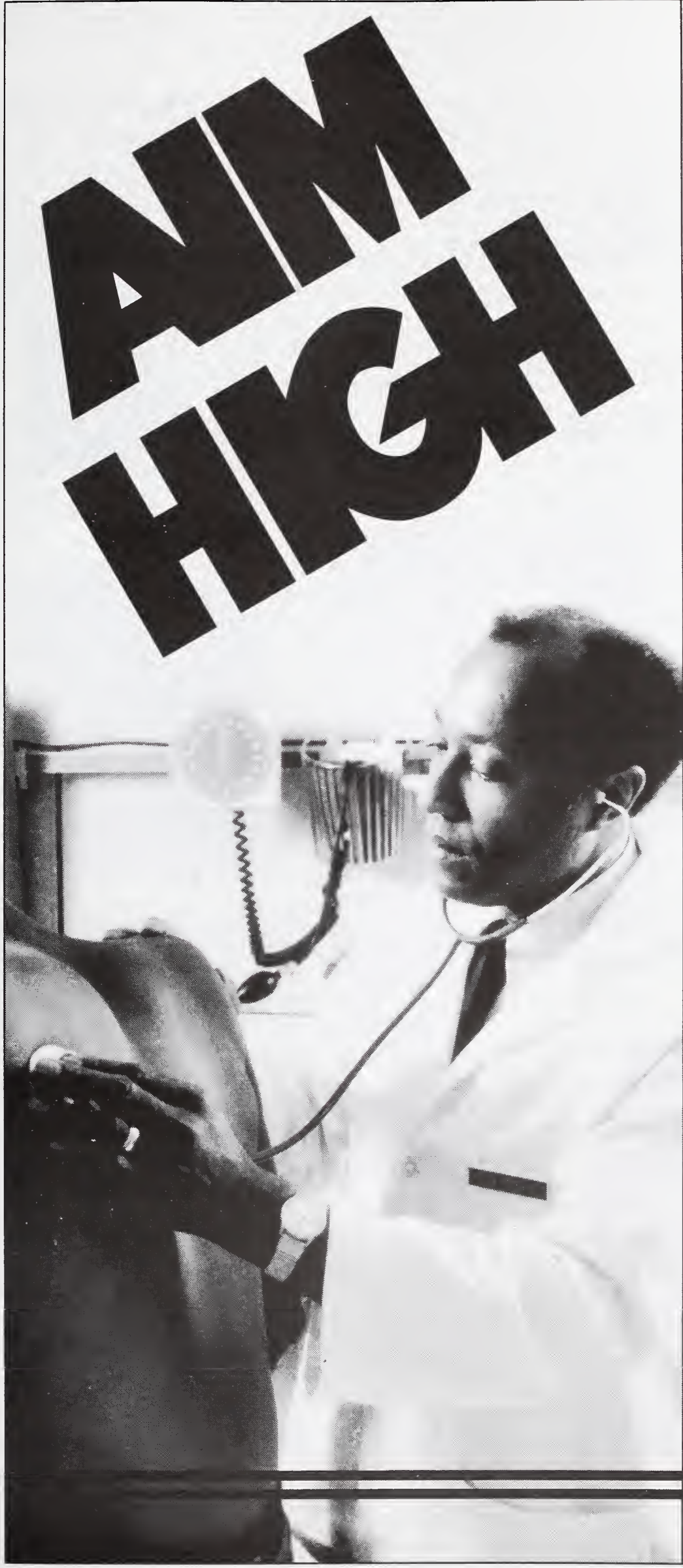
Underlying Cause of Death

	Reporting Period			
	April 1996	12 Months Ending with April 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	243	3,234	326.7	4,226.0
Malignant Neoplasms	207	2,549	257.5	7,118.5
Cerebrovascular Diseases	58	629	63.5	657.0
Injuries (Accident/Suicide/Homicide)	31	324	32.7	5,920.0**
COPD	39	364	36.8	325.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.



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Philately in Medicine

John Tierney

The First Physicians Individually Portrayed on a Postage Stamp

An earlier column had discussed "Signers of the Declaration of Independence" [US, 1869, #120], which is recognized as the first medical stamp. Over time there gradually emerged yet another classification of medical stamps which portrayed physicians, as individuals, on postage stamps. The distinction of being the first in this category is Ecuador, which included two physicians as part of a set of eight stamps issued in 1899 [Ecuador, 1899, #137-144.] The set was issued primarily to honor Ecuador's early revolutionary heroes rather than its artists or scientists.

Jose Mejia y Lequerica (1776 - 1813) [Ecaudor, 1899, #140] was born in Quito, the son of a farmer. He enrolled as a student in San Fernando University and eventually transferred to Santo Tomas University, in Acquino, where he studied both philosophy and medicine. In 1809 he received degrees in both subjects. After his appointment to the faculty he instituted notable changes in an effort to improve the educational programs of the University. However, he experienced much prejudice from people who resented both his origins in a lower social class and his academic achievements, and he was forced to resign.

In 1807, shortly after Napoleon began his Spanish expedition, Mejia went to Spain where he joined the Spanish army. After the war he remained in Spain achieving prominence as a legislator in the southern city of Cadiz. He died during one of the recurrent yellow fever epidemics involving southern Spain.

Francisco Javier Eugenio de Santa Cruz y Espejo (1747-1795) [Ecuador 1899, #141] was the son of a native Ecuadorean who studied medicine in a charity hospital in Quito becoming a physician in 1767.

He became interested in communicable diseases even though the sciences of bacteriology and rational preventive medicine had not yet been developed. He promoted various measures to improve the environment of Quito and to lessen the impact of recurrent epidemics. Espejo's views were regarded as too radical and he was, in essence, exiled from Ecuador in 1782 and assigned as a member of an expedition to the Amazon. In 1787 he escaped to Bogota where he joined the liberal independence groups fighting for autonomy of the Spanish colonies in South America. He continued his political writings and joined a radical movement committed to placing the control of the Roman Catholic Church under the national government. He published his views on church administration in a book entitled *El Nuevo Luciano.*

Espejo was arrested in Bogota. After his release he returned to Ecuador where he continued his radical activities. In 1795 he was arrested by the local authorities. He died that same year shortly after his release. Espejo was highly regarded in Ecuador both as a patriot and a physician. In his home country he is hailed as the father of both medicine and science.

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THE RHODE ISLAND MEDICAL JOURNAL

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Ninety Years Ago

[April, 1907]

The Journal publishes a symposium on obstetrical labor. The first paper, by W.H.Buffum, MD, discusses the hygiene of pregnancy: "Pregnancy is, a priori, a physiological condition and therefore a woman should never be permitted to consider that she is a patient suffering from a disorder; but the borderline between health and disease is greater than at other times, consequently special attention should be given to hygiene during gestation." Three major categories of concern are addressed: the toxemia of pregnancy; abortion, miscarriage and premature labor; and infections, either local or general. The author then discusses the prudent measures taken to maintain the health of the pregnant mother and the viability of the fetus. For constipation, the author recommends "such remedies as bismuth, cerium oxalate, cocaine, ingluvin, arsenic, charged water, champagne and rest are among the first to be used."

Carlos Hilliard, MD, discusses the management of normal labor. He begins his analysis with the following prescription: "Take of preparedness two parts, strictest cleanliness seven parts, and of patience, cheerfulness and common sense a sufficient quantity to make a pleasant and agreeable mixture. Sign it: To be taken by every physician at every confinement he attends." The article specifies those early confinement arrangements to be undertaken, including the kind of bed, which home room should be prepared, and the nature of the linens, rubber sheets and basins needed for the home delivery. The article lists the instruments which the physician must have available to him under such circumstances, including stimulants, ergot, chloroform, sterilizing agents and gauze. The author then lists, in sequence, the steps needed to prepare the expectant mother, the hygienic measures, the anesthetic interventions, the care of the placenta and, of prime importance, the care of the newborn infant.

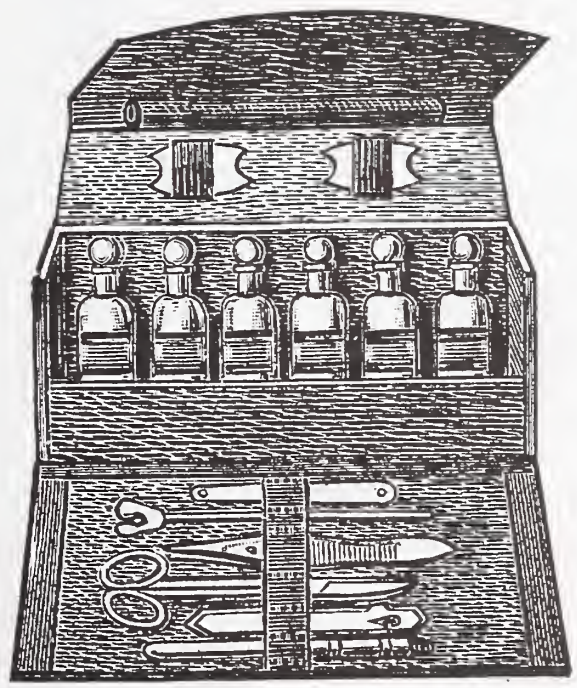
H.G.Partridge, MD, outlines the pathology of labor, emphasizing those complications due to abnormal maternal conditions and those due to pathologic states associated primarily with the fetus. The article touches upon such entities as uterine inertia, cervical rigidity, premature rupture of the membranes, pelvic neoplasms particularly uterine fibroids, and hemorrhage either before, during or after labor. In addition, the author reflects upon uterine rupture, puerperal eclampsia, fetal malpositions, prolapse of the cord or extremities and abnormalities of fetal size.

Finally, Charles Higgins, MD, discusses operative treatment during labor, particularly podalic maneuvers and forceps-aided deliveries.

The Journal announces that the medical school of the University of Pennsylvania [the oldest medical college in the US] has just raised its admission requirements, now demanding a minimum of two years of general college with emphasis upon the basic sciences.

A notice from the Surgeon General announces competitive examinations for medical posts in the Public Health Service. Starting salaries are $1,600 per year.

Charles V. Chapin, MD, summarizes the health of Providence during the prior December and January. He notes a mortality rate of 18.8 during the prior year. There were more deaths from measles than from heart diease. The number of deaths from typhoid, scarlet fever and diphtheria continue undiminished. Only one case of rabies, however, was reported during 1906.



Fifty Years Ago

[April, 1947]

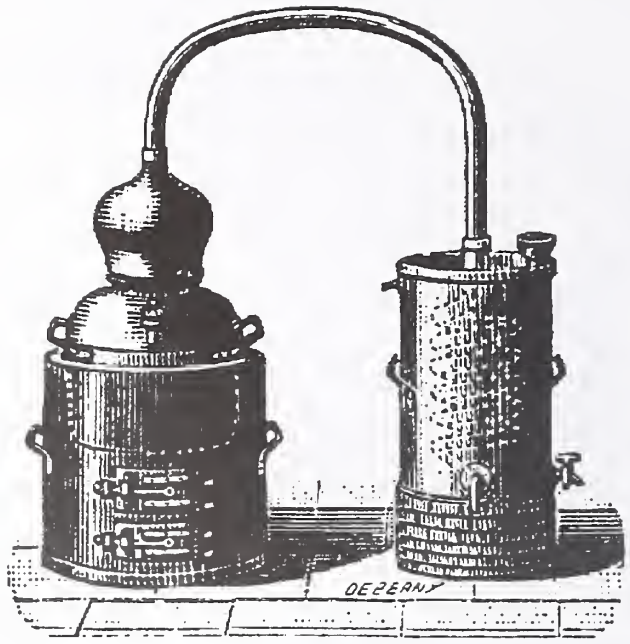
F. Ronchese, MD, presents a paper describing a case of xeroderma pigmentosum resulting in extensive facial disfigurement. The disease carries a great risk of neoplastic transformation of these skin lesions.

Roland Hammond, MD, President of the Rhode Island Medical Society, provides a scholarly treatise on medicine in the time of the crusades.

Arthur D. Weston, Chief Sanitary Engineer of Massachusetts, discusses water pollution control, detailing the tragic extent to which the tidal, coastal and river waters of New England have been polluted by industrial and sewage wastes. "It is because of these accumulated aggravating conditions that throughout the country as a whole there has been a deluge of requests for either State or Federal legislation for water pollution control."

The Journal editorial recommends aggressive vigilance in making certain that pollution control laws are both enacted and observed.

Many cigarette companies carry fullpage advertisements, including one from R.J.Reynolds Inc., declaring that "More Doctors Smoke Camels than any other cigarette."



Twenty Five Years Ago

[April, 1972]

William J. MacDonald, MD, discusses the present and future aspects of medical practice in Rhode Island, stressing the fact that the state is a unique social laboratory for the study of various systems of medical care delivery. He concludes: "I am still idealistic enough to believe that the vast majority of people who are involved in the delivery of health care, including physicians, are sincerely trying to provide the best medical care to the most people at the least cost."

Jesse L. Steinfeld, MD, Surgeon General of the United States, offers a paper on the physician's responsibility to his smoking patient. He emphasizes the need for the physician to be actively involved, to make information available to the patients, to ban smoking from the private office, to encourage the banning of smoking in public places, to recognize the health dangers in high risk patients and to participate in community activities which emphasize the medical hazards of smoking. Dr. Steinfeld then discusses a bill of rights for the non-smoker in the community. He concludes with this declaration: "There is no disagreement - cigarette smoking is deadly."

The lead editorial expresses deep concern that increasing numbers of women are smoking cigarettes, partially in response to a massive advertising campaign.

The newly elected President of the Rhode Island Medical Society, Robert V. Lewis, MD, offers an encouraging call to the state's practitioners to particpate actively in the affairs of the Society, its goals, as well as in the newly created medical degree-conferring program at Brown University.

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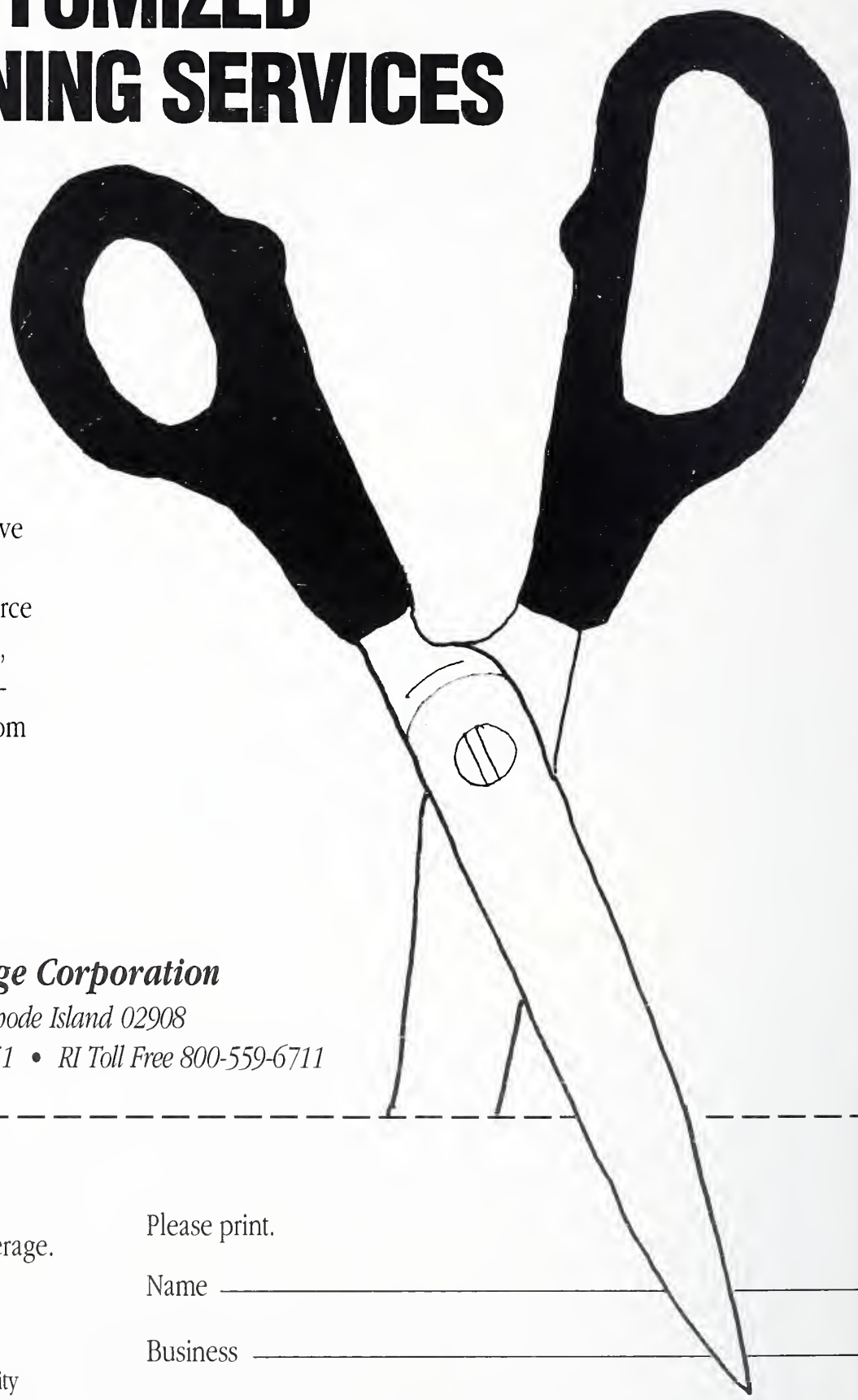

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Cover: SURFACE OF THE BRAIN, *from Samuel Solly,* The Human Brain, *London, 1836.*

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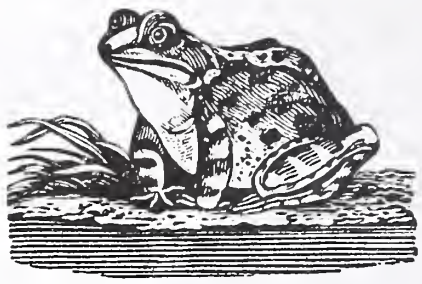

The Talking Frog and the Neurologist

C. Miller Fisher, MD, a neurologist famous for his clinico-pathologic correlations, is credited with the observation that neurologists learn their discipline, stroke by stroke. Indeed, it has been primarily through the study of stroke- related dysfunction that we've learned how the brain both works and fails to work. Until relatively recently the study of stroke was primarily observational. Stroke syndromes were described. Risk factors were identified. Recovery rates and patterns were elucidated. In the last decade, however, we have seen the beginning of progress in the battle against stroke. Aggressive treatment of hypertension has reduced stroke incidence. Recognition of systolic hypertension as a risk factor has led to increased use of antihypertensives. And after decades of controversy, carotid endarterectomy has been shown to lower the rate of stroke in symptomatic patients with stenosis greater than 70%. The first proven treatment for acute stroke, tPA, has produced some benefit in outcome when initiated within the first three hours of stroke onset.

For the first time, trials have been started to attempt alteration of the cascade of events that occur when ischemia first affects the brain. Trials to reduce stroke size by altering various metabolic paths leading to cell death, or by initiating and accelerating recovery of threatened neurons are in progress. Further attempts at restoring blood flow to threatened areas, beyond the use of tPA, are under evaluation. Trials of angioplasty and stenting appear promising.

There are several jokes that physicians like to tell about neurologists. One concerns the two men walking down the road who come upon a large frog. As they approach it, the frog doesn't jump away. Instead it starts to talk and says, "Kiss me and I'll turn into a neurologist." One of the men picks up the frog and puts it into his pocket. The second man asks why he doesn't kiss the frog. "A talking frog is worth more than a neurologist." As we are halfway through the "decade of the brain," we have taken the first small but important steps in our quest to control multiple sclerosis with immune-modulating drugs, amyotrophic lateral sclerosis with anti-excitotoxic drugs, Alzheimer's disease with cholinergic medications, and stroke, with thrombolytics and better surgery. In each of these disorders the treatments are more important for their promise than for their current efficacy. What has been shown, however, is that each of these disorders can be treated. The barriers have been breached. Within the near future all will be considered "treatable." The neurologist has become more valuable than the talking frog.

– Joseph H. Friedman, MD
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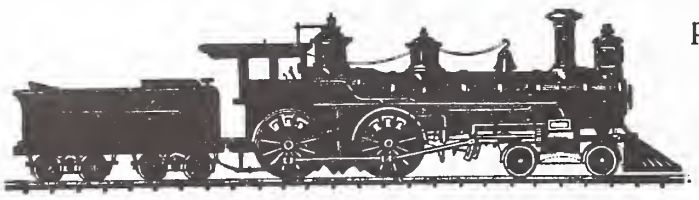
Pawtucket, RI 02860

Saint Gotthard's Unwanted Burden

Progress is rarely achieved without notable sacrifice. The 19th century establishment of a railroad line between Switzerland and northern Italy, thought to be impossible to build, was finally completed, but only after years of immense cost and substantial risk to thousands of construction workers.

Crucial to the establishment of this north-south European communications link was the construction of a tunnel through the southern Alps carrying the tracks of the Lucerne to Milan railroad line. Excavating this tunnel, about 9.2 miles in length, began in 1872 and continued without interruption for some nine years. The tunnel ran beneath the St. Gotthard alpine pass.



From the beginning, the construction of the Alpine tunnel, an immensely ambitious undertaking, encountered many unforeseen problems. It was essential, for example, that the grade of the tunnel not exceed a certain critical angle. This forced the civil engineers to interpose numerous switchbacks in what had been planned to be a direct tunnel. The most insistent problem, however, became apparent only after the passage of months. Supervisors of the tunnel work crews noticed that many of the men, quite robust when hired, progressively lost weight and

became increasingly fatigued after only a few months of underground employment. A typical worker suffering from this baffling illness [ultimately known as St. Gotthard's disease] displayed the following sequence of clinical features: increasing fatigue, unremittent weight loss, pallor and shortness of breath. Physical examination of these distressed excavation workers usually showed an increased pulse rate, cardiac palpitations, profound pallor, epigastric tenderness, occasionally some ankle edema, mild confusion and forgetfulness. Examination of their blood showed a uniformly diminished hemoglobin content. Years later, when the disorder had been studied more rigorously, the blood change was shown to be a severe microcytic, hypochromic anemia.

Moderate numbers of the workers were dying of this disorder - prompting a more earnest inquiry into its cause. Some public health consultants noted the striking similarity between this obscure illness and a malady frequently seen in underground coal miners of Belgium and western France. A debate then arose in an effort to identify which environmental element common to coal mining and tunnel digging might result in this disabling - and sometimes fatal - disorder. Conjectures included an ill-defined miasmic gas breathed in by the diggers, or perhaps some inapparent anemia-causing particulate matter liberated into the tunnel air when the earth was moved. Learned committees of sanitarians speculated for months but came no closer to the etiology of St. Gotthard's disease. Some sanitarians who had actually ventured into the depths of the tunnel were impressed with the primitive working conditions and particularly the considerable interior heat requiring the workers to go shirtless and barefooted. They observed, too, that the work shifts were long and that the interior of the tunnel provided no sanitary facilities, thus compelling the workers to use the tunnel floors for defecation and urination.

By 1879 sufficient numbers of autopsy examinations had finally provided the Italian scientists with a likely cause for the debilitating anemia. They demonstrated the presence of large numbers of nematode worms adherent to the duodenal mucosa of the victims. These worms, each about a centimeter in length, were shown to be in the family of *Ancylostoma* [Greek, hookmouth], a human enteric parasite identified as a human pathogen in 1838 and which went by the street name of hookworm. It was presumed that each worm when anchored to the gut wall withdrew a small amount of blood each day; and if there were sufficient numbers of worms they might collectively cause the anemia through constant blood loss. Later studies confirmed that the average worm consumed about 0.3 ml. of human blood per day. The blood loss per individual worm was thus negligible. But when the numbers of viable hookworms exceeded a thousand in a single victim's intestine - as was the case frequently - the blood loss became extensive and unremitting. A quantitative relationship between the *number* of active hookworms [called the worm burden] and the *severity* of the secondary anemia became evident. Workers with only a small number of hookworms maintained the appearance of good health. Thus, a fundamental distinction arose between hookworm *infection* and hookworm *disease*, but parasitologists readily admitted that the transition point between the two, as determined by numbers of worms, was ill-defined.

The etiological connection between the tunnel-working conditions and the subsequent hookworm infestation, however, remained elusive until Italian parasitologists were able to demonstrate free-living filariform hookworm larvae on the fecally-contaminated tunnel floor. Within years, the remaining components of the hookworm life-cycle were finally clarified: adult hookworms mate within the small intestine of the parasitized human, the female producing in excess of 20,000 eggs per day which are then excreted in the feces. If the stools are deposited upon a warm, moist, dark surface, the ova quickly segment, evolving within days into barely visible larvae capable of limited locomotion. When in contact with mud-encrusted, bare feet, and attracted to the feet by body heat, the larvae easily penetrate the skin and enter the internal circulation ending finally in the victim's lungs. From the alveolar spaces, the worms then migrate to the pharynx and are carried passively through the stomach until their rostral hooks anchor themselves to the small intestinal mucosa. The worms then secrete enzymes which allow them to penetrate the mucosal membrane thus reaching the underlying vascular bed. The worms voraciously extract blood, mate and produce another generation of eggs; and the cycle begins anew.

These studies alerted the international community of physicians to the dangers of hookworm, and the means by which infestation might be reduced. Surveys in various geographic sites then revealed the astonishing fact that the majority of people in most subtropical and tropical regions were parasitized by

hookworm. Studies in the southern states of the United States uncovered a similarly widespread hookworm parasitism particularly in the rural poor. In 1912 the newly established Rockefeller Sanitary Commision took on the suppression of hookworm as its first mission; and twenty years of sustained effort resulted in a substantial reduction in the prevalence of hookworm in these southern states. This effort consisted of aggressive treatment programs and educational interventions stressing the importance of wearing shoes and using privies. Hookworm, however, continues to constitute a global problem. The World Health Organization estimates that one human in four is affected by hookworm.

And what of the venerable Gotthard ? He was born in Bavaria in the year 960, entering the Benedictine order as a young adult. He showed great administrative skills and was given progressively more burdensome duties particularly in the management of the regional monasteries; and ultimately he was appointed Bishop of Hildesheim in Lower Saxony. Amongst his many humanitarian accomplishments was the founding of a home for the poor and disabled. He was sainted in 1131. When, two centuries later, a rude and inconsequential shelter for alpine pilgrims was constructed at a site about 400 miles south of Hildesheim, some unremembered soul named it for Gotthard. Later, when the neighboring pass needed a name, it was readily called St. Gotthard's pass; and clearly when a tunnel was excavated beneath this pass, the name of St. Gotthard once again seemed to be the natural choice. And finally, when a perplexing malady affected the tunnel workers, St. Gotthard's disease became its obvious title. Thus was a gentle, pious administrator who had never even visited southern Switzerland made, by happenstance, to bear the eponymic burden of hookworm disease.

– Stanley M. Aronson, MD

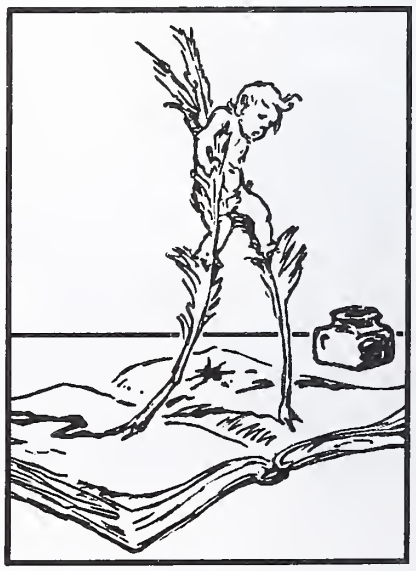
The Fires of Saint Anthony

Pont Saint-Esprit took pride in the ancient span crossing the Rhone River. It was not as famous perhaps as the legendary bridge at Avignon some 40 kilometers to the south, but it was nonetheless one of the few distinguishing landmarks in this southern French village. There was, in truth, little in Pont Saint-Esprit to delay the many tourists constantly swarming through Provence. The village, but one of many anonymous little towns of rural France, survived solely by its local enterprise, particularly its surrounding vineyards. And, of course, it had a mayor, three local physicians and two bakeries to answer its secular needs for administration, health care and daily bread.

In mid-August 1951, one of the town's two bakers noted some greyish discoloration of the flour used to make his morning baguettes. With no alternative sources [in southern France, flour distribution is a government monopoly] he proceeded with his customary morning baking chores. Within 24 hours some 230 villagers, all his customers, became violently ill. The disorder generally began with lightheadedness and progressed rapidly to nausea, vomiting, vertigo, dyspnea, diarrhea and a dramatic reduction in body temperature; despite the excessive summer heat, many of the victims complained bitterly of being cold. Some also displayed extremes of behavior including hallucinations, euphoria, deep depression and even suicidal ideation. Within days some became violently delirious and uncontrollably agitated. Still others told of severe burning pains in their extremities culminating at times in gangrene. Some of the women suffered from uterine bleeding.

Belatedly, and with a growing sense of horror, a few of the consulting physicans perceived a resemblance betweeen the current difficulties in Pont St. Esprit and prior epidemics of ergot poisoning [the last such outbreak on French soil had been in 1819]. The police, on the other hand, presumed that they were witnessing some form of mercurial intoxication, although laboratory data pointed to ergotism. It was months before the turmoil ebbed; the village of Pont St Esprit then lost its retinue of outside experts and returned to a semblance of normal life. The memory of *le pain maudit* [the accursed bread] has lingered, however, and many questions remain unanswered.

Ergotism had been an occasional curse to rye-eating populations for millenia. The ancient Egyptians were aware of a disease caused by the eating of certain grains which caused both convulsions and hallucinations. Historically, rye had been the predominant grain of the Celts particularly their peasant poor. The first documentation of a European ergot epidemic came in the 11th century and was then called variously *ignis sacer* [Latin, holy fire], *pestis igniaria, feu sacre, heilige Feuer* or St. Anthony's Fire. Two clinical types of the fearsome disease were generally encountered: one leading to exceedingly painful limbs [perceived as though they were afire] ending fre-



quently in gangrene; and the other, predominantly cerebral, with hallucinations, convulsions and an agitated dementia. Ergotism was less common in England although major outbreaks were recorded in 1762. London's Bills of Mortality for the year 1734 listed six deaths caused by St. Anthony's Fire. During the same time interval, there were 4,139 deaths from consumption and 2,688 deaths from smallpox. Only in Russia did ergotism constitute a major public health hazard particularly in times of famine when even blighted grain was readily consumed.

In 1597 University scientists in Marburg observed that clinical ergotism often appeared after blighted rye grain was consumed. They noted further that the advent of the blight was hastened by cold, damp growing seasons. In 1630 the feeding of blighted rye grain to animals caused an illness quite similar to the human disorder. And by the 19th century, the pathogenic agent was recognized as a ubiquitous fungus, *Claviceps purpurea*, capable of elaborating a variety of pharmacologically active alkaloids.

Ergot-contaminated rye grain was probably used by midwives as a substance to hasten delivery and perhaps to induce abortion. It was, however, a New York City physician, John Stearns, who in 1809 recognized the therapeutic value of a derivative of the ergot fungus which he called *pulvis parturiens.* He claimed that a preparation derived from blackened granary rye seed expedited lingering parturition, strengthened uterine contraction, hastened the delivery of the placenta and dramatically diminished postpartum bleeding. Various ergotamine preparations are now used routinely in obstetrical practice.

The intersection between St. Anthony and ergotism requires some understanding of medieval history. Anthony was a 4th century Christian who foreswore earthly goods and the company of man to wander alone in the Egyptian desert for much of his lengthy life. Close to death, he requested that his remains be scattered in the desert, but as one of the founders of the monastic movement his body was nonetheless transferred in reverence to Alexandria. When the city was sacked by the Saracens in 1070, his remains were taken to Constantinople. And when this city was captured by crusaders, Anthony's bones were again relocated to the town of Dauphine, France. A century later a local nobleman prayed before the relics of the Saint vowing to aid future ergot victims if only his son recovered from the disease. The monastic Order of St. Anthony creating hostels for ergotism sufferers was thus formed. Iconic representations of St Anthony are readily identified; he is depicted as an elderly, bearded man with a large Greek Tau on the left shoulder of his red robe. He carries a crutch and is accompanied both by a sow with bells upon her neck and by sufferers portrayed in intense pain, with withered limbs aflame.

In the early 1950's. a number of Swiss pharmaceutical chemists concentrated their research upon various alkaloids derived from ergot. They noted, first, that ergot hydrolysis yielded a cleavage product which they called lysergic acid [Greek *lys-*, to dissolve, and *erg-* derived from ergot]. Further efforts yielded a synthetic derivative called lysergic acid diethylamide [or LSD] which when self-administered produced major hallucinatory and behavior-altering episodes. In the somewhat clouded investigative efforts conducted during the next few decades - research sometimes tinged with mysticism, variant religion and drug abuse - analogous psychodysleptic derivatives were isolated from mescaline-generating plants [such as the cactus *Lophorphora williamsii*] and from certain Mexican highland mushrooms.

Pharmacologists now conjecture that different strains of *Claviceps purpurea* yield different alkaloids - or at least different concentrations of a range of alkaloids, some causing vasospastic changes in limbs predominantly; and some, which are serotonin-antagonists, causing hallucinations and dramatic mood swings. During the fateful summer of 1951, the embattled citizens of Pont Saint-Esprit seemed to have been the victims of both major forms of ergot alkaloid intoxication.

– Stanley M. Aronson, MD

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The Epidemiology of Stroke: A Focus on Rhode Island

Karen L. Furie, MD, MPH, and Janet L. Wilterdink, MD

Stroke is the third leading cause of death in the United States but its major impact on public health is a re sult of its morbidity. To prevent stroke, clinicians must first explore the epidemiology of cerebrovascular disease; such exploration helps identify individuals at risk, risk factors, and prognosticators of recovery. In the last decade interest in the epidemiology of cerebrovascular disease has increased as data from large cardiovascular cohorts have become available.

Stroke epidemiology data can be difficult to interpret. For example, the definition of stroke usually encompasses ischemic stroke, intracerebral hemorrhage, and subarachnoid hemorrhage mainly because in the era before computed tomography it was impossible to distinguish between these diagnoses. Yet these distinct entities have unique risk factors and different prognoses. Transient ischemic attacks may or may not be included in the definition of stroke used to determine the incidence, prevalence, and mortality of cerebrovascular disease.

Incidence rates, prevalence, and mortality rates are the basic components of the epidemiologic assessment of stroke within a population. While death certificates yield the most readily available data, mortality is not synonymous with incidence and may be affected by a number of variables. Incidence measures the number of new cases of disease in a given time period. Prevalence, the measure of existing cases at a particular point in time, a more germane measure of the burden of stroke on society, can be difficult to gauge.

Finally, data from large cohorts may lead to skewed generalizations. The information is relevant to the defined populations, traditionally middle-aged white men, but cannot necessarily be generalized to other racial and gender groups. To rectify this gap, several studies now collect data from specific gender and minority groups.

Abbreviations Used:

CDC	Centers for Disease Control
ICD	International Classification of Disease

Data on the population of Rhode Island were obtained from the Mortality Statistics reported by the Center for Disease Control (CDC) and the CDC Hospital Discharge Survey. These Internet-based data sets were searched by ICD9 codes for information on mortality and disposition after ischemic stroke and intracerebral hemorrhage.

Mortality

Stroke mortality is affected by incidence and case-fatality. Case- fatality measures the mortality rate within a proscribed period from an event. Thus, there may be a difference between the 30-day mortality after stroke, largely attributable to direct sequelae of the stroke itself, and the overall mortality after stroke, attributable to cardiac mortality in the majority of patients. It is essential to age-standardize rates since there is a clear association between increasing age and increased stroke risk.[10]

Stroke mortality has been decreasing over the last two decades in the United States and internationally. Most epidemiologists attribute this to a decline in case fatality.[1-8,17] In the Framingham study, stroke severity and mortality decreased, but not incidence. Prevalence rates increased.[4] In the Minnesota Heart Survey stroke mortality declined from 1960 to 1972, then stabilized until 1990. The decline in mortality can in part be attributed to reduction in risk factors.[7]

In Rhode Island the annual stroke mortality rate for persons over age 35 decreased from 48.56 to 11.36 per 100,000 people between 1979 and 1992 - demonstrated in

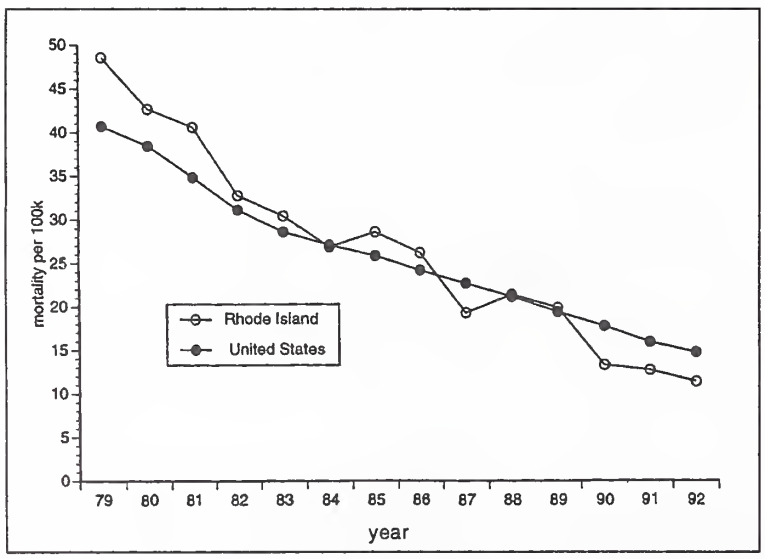

Figure 1: Changing Cerebral Ischemia Mortality 1979-1992.

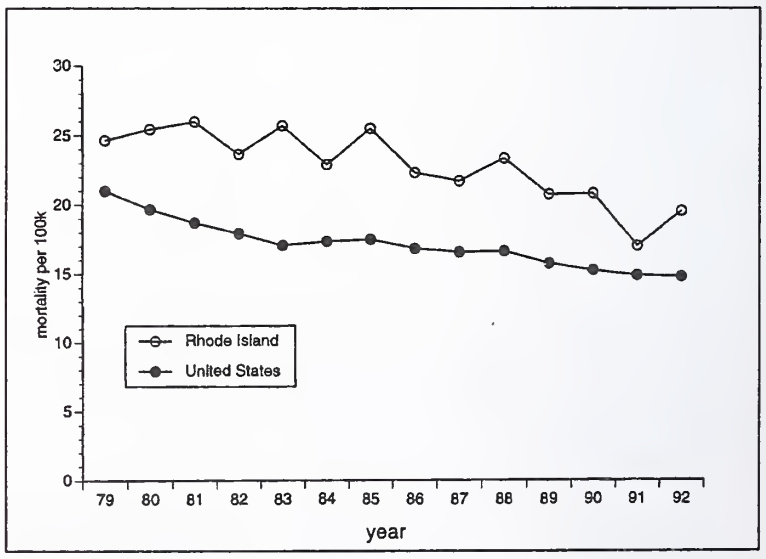

Figure 2: Changing ICH* mortality 1979-1992

*ICH = Intracerebral Hemorrhage

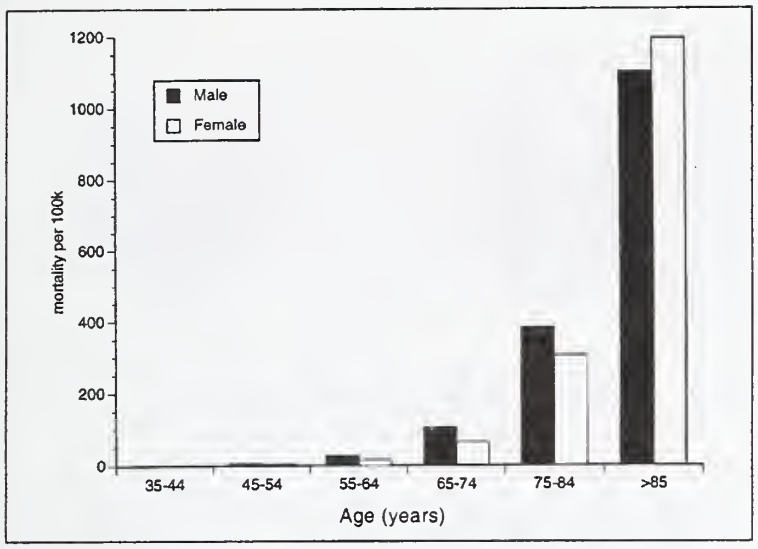

Figure 3a: Ischemic Stroke Mortality: RI 1979-1992.

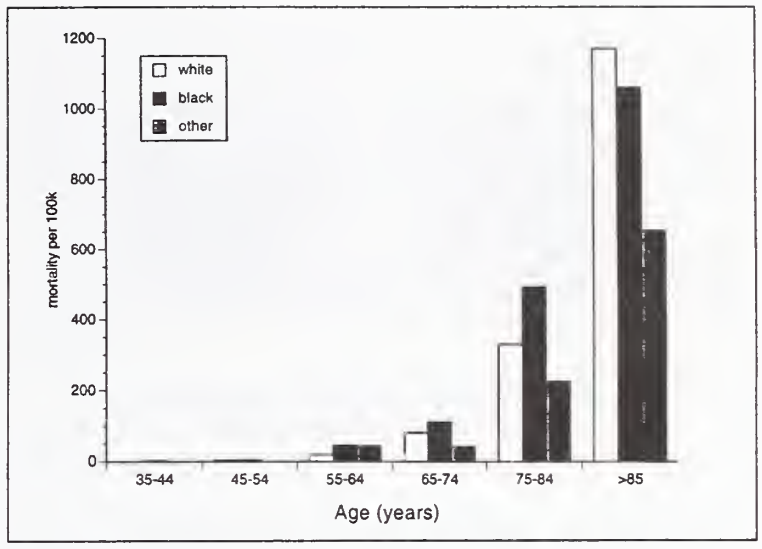

Figure 3b: Ischemic Stroke Mortality: RI 1979-1992

relation to the national trend in Figure 1. Although mortality from intracerebral hemorrhage declined over the same period, the mortality rate remains higher than the national average (Figure 2).

Incidence

Incidence is the rate of new cases of disease identified in a specified period of time. It is imperative to establish a mechanism for identifying new cases and strict criteria for case definition. Whereas death certificates identify fatal strokes, the identification of all strokes, even those that occur at home or in-hospital while admitted under another diagnosis, poses a greater challenge. The definition of a stroke is usually based on clinical data, but inconsistencies in evaluation of patients may lead to aberrant results. For example, patients who have MRI scans either as part of a study or routine medical care will appear to have a higher incidence of stroke because there is greater likelihood of small symptomatic or asymptomatic lesions being identified. Thus in comparing studies, it is important to bear in mind that different case definitions may explain disparities in incidence rates.

Incidence rates, prevalence, and mortality rates are the basic components of the epidemiological assessment of stroke within a population.

There is some conflict over the trend of stroke incidence over the last two decades internationally. Some studies have documented decreasing rates, [9] but most show no change.[1,2,3,4,10,16,17]

No data describes the incidence of stroke in Rhode Island. Stroke admissions to all hospitals could be used as a proxy, but this would omit patients never hospitalized. In addition, incidence should reflect only new cases, i.e. in patients who have never had a stroke, further complicating identification of these patients. A reasonable method of collecting this data would be a statewide surveillance mechanism to identify all new cases of stroke and study them prospectively using a pre-ordained definition of stroke.

Prevalence

The Rotterdam Study, measuring self-reported stroke in a cohort, found the following rates:[11]

	men	women
age 55-64	2.5%	1.6%
age 65-74	5.0	3.3
age 75-84	8.9	6.7
age 85+	11.6	10.5

In the Framingham study, there appeared to be an increase in prevalence over the last two decades, a logical consequence of improved stroke survival.[4]

No data for stroke prevalence is available for Rhode Island. One method of determining the prevalence would be to perform a cross-sectional survey and ask participants to self-report whether they ever had a stroke. Although subject to reporting bias, this method would provide an estimate of prevalence.

Gender, Race and Stroke

Incidence rates for males are approximately double those for females.[10] Internationally, the rates of stroke mortality have been higher in women.[8] In Rhode Island, stroke mortality is higher in men at all ages, although the greatest disparity in mortality by gender is in the group aged 65-74. Competing causes of death, mainly from cardiovascular disease, probably account for the absence of as great a difference in persons over age 75.

The definition of racial and ethnic groups is fraught with difficulties. Individuals self-report themselves into broad categories: white, black, Hispanic, Asian. Individuals of mixed heritage must self-select their racial identity, or declare themselves "other." There is no means of effectively establishing more telling ethnic characteristics which may affect cardiovascular and stroke risk. For example, lump-

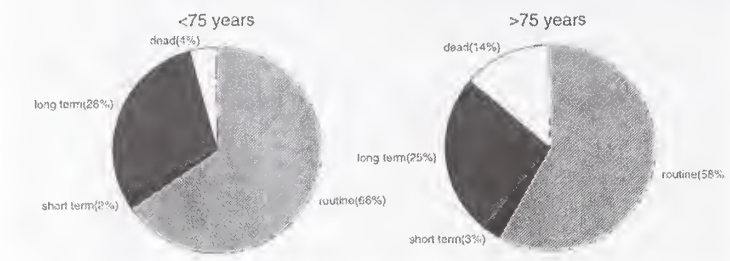

Figure 4a: Disposition on Hospital Discharge:
Cerebral Ischemia: 1988-1990

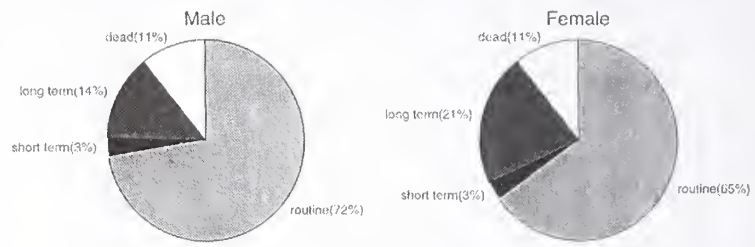

Figure 4b: Disposition on Hospital Discharge:
Cerebral Ischemia: 1988-1990

ing all Spanish- speaking individuals as Hispanic obliterates lifestyle differences that reflect different cultures. Mexicans and Puerto Ricans may have different patterns of stroke risk and outcome based on regional practices. Thus, although stratifying by race may provide a clue as to which segments of the general population are at significantly greater risk of stroke, limitations in classification and generalization must be recognized.

Stroke rates in black and Hispanic ethnic groups do vary from those of the white population. Morbidity and mortality rates have been higher in African-Americans, with the inverse relationship between socioeconomic status and mortality particularly marked.[13] African-American men and women have a 4-and 3 -fold increase in stroke mortality over whites, respectively. Over age 75, the discrepancy diminishes; however, African-American men in this age range have the highest mortality rates. Over age 85, white women have a higher stroke mortality than African-American women.[14] The reason for the decline in stroke mortality in older African-Americans may be death by competing causes. Stroke mortality rates for young Hispanics and whites have been found to be similar, but there is a paradoxically lower mortality in older Hispanics.[12] One potential explanation is that older Hispanics have maintained traditional diets, high in protein and low in fat. Younger Hispanics who have grown up in the United States have adopted a high-fat, high-calorie diet, and may be shifting the pattern of disease in their population.

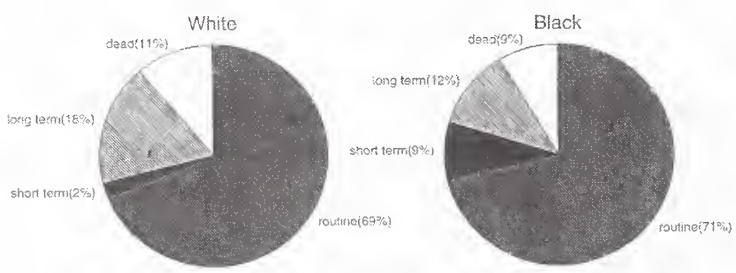

Figure 4c: Disposition on Hospital Discharge:
Cerebral Ischemia: 1988-1990

Stroke mortality data stratified by gender and race for Rhode Island between 1979-1992 are presented in Figures 3a and 3b . The gender differences are consistent with national data, with higher age-adjusted rates for men. African-Americans had a higher rate of stroke mortality. In Rhode Island the "other" category includes small numbers of Hispanics, Asians, Indians, and groups who do not identify themselves in the conventional classification scheme.

Stroke Outcome

Diminishing motor and language deficits, functional disability, and lower incidence of coma have been noted over the last two decades.[1,17] One surrogate measure of stroke outcome is disposition at time of discharge. One study found more women than men with stroke who lived at home before admission discharged to a nursing home; however, women with stroke were sicker at admission. No difference between men and women was demonstrated in the utilization of services.[15]

Data from Rhode Island on hospital discharge disposition after stroke, stratified by age, gender, and race, are presented in Figures 4a,4b,4c . The only gender difference in disposition was a 7% higher rate of long-term placement for women. There were no major differences between African-American and white stroke patients, but the former were more likely to go to short rather than long-term placements. As would be expected, older patients had higher mortality rates, but not higher rates of short or long-term placement.

Conclusion

The pattern of stroke mortality in Rhode Island is, for the most part, consistent with the national trend over the last two decades. The one exception is the difference in mortality from intracerebral hemorrhage. Many factors could contribute to this apparent discrepancy, and it may warrant future study. There are clearly limitations in trying to collect stroke-related data other than mortality. A statewide registry is one feasible means of gathering information on incidence, prevalence, risk factors, and outcome.

References

1. Stegmayr B, Asplund K, Wester PO. Trends in incidence, case fatality rate, and severity of stroke in Northern Sweden, 1985-1991. *Stroke* 1994;25:1738-1745.
2. Harmsen P, Tsipogianni A,Wilhemsen L. Stroke incidence rates were unchanged, while fatality rates declined, during 1971-1987 in Goteborg, Sweden. *Stroke* 1992;23:1410-1415.
3. Hong Y, Bots ML, Pan X, et al. Stroke incidence and mortality in rural and urban Shanghai from 1984 through 1991. *Stroke* 1994;25:1165-1169.
4. Wolf PA, D'Agostino RB, O'Neal A, et al. Secular trends in stroke mortality. The Framingham study. *Stroke* 1992;23:1551-1555.
5. Howard G, Toole JF, Becker C, et al. Changes in survival following stroke in five North Carolina counties observed during two different periods. *Stroke* 1989;20:345-350.
6. Shahar E, McGovern PG, Sprafka M, et al. Improved survival of stroke patients during the 1980's. The Minnesota stroke survey. *Stroke* 1995;26:1-6.
7. McGovern PG, Burke GL, Sprafka JM, et al. Trends in mortality, morbidity, and risk factor levels. *JAMA* 1992;268:753-759.
8. Bonita R, Stewart A, Beaglehole R. International trends in stroke mortality: 1970-1985. *Stroke* 1990; 21:989-992.
9. Kagan A, Popper J, Reed DM, et al. Trends in stroke incidence and mortality in Hawaiian men. *Stroke* 1994;25:1170-1175.
10. Lindenstrom E, Boysen G, Nyboe J, Appleyard. Stroke incidence in Copenhagen, 1976-1988. *Stroke* 1992;23:28-32.
11. Bots ML, Looman SJ, Koudstaal PJ, et al. Prevalence of stroke in the general population. The Rotterdam study. *Stroke* 1996;27:1499-1501.
12. Howard G, Anderson R, Sorlie P, et al. Ethnic differences in stroke mortality between non-Hispanic whites, Hispanic whites, and blacks. *Stroke* 1994;25:2120-2125.
13. Modan B, Wagener DK. Some epidemiological aspects of stroke: mortality/morbidity trends, age, sex, race, and socioeconomic status. *Stroke* 1992;23:1230-1236.
14. Morgenstern LB, Spears WD, Goff DC, et al. African Americans and women have the highest stroke mortality in Texas. *Stroke* 1997;28:15-18.
15. Pearson ML, Kahn KL, Harrison ER, et al. Differences in quality of care for hospitalized elderly men and women. *JAMA* 1992;268:1883-1889.
16. Shahar E, McGovern PG, Pankow JS, et al. Stroke rates druing the 1980's. The Minnesota stroke survey. *Stroke* 1997;28:275-279.
17. Barker WH, Mullooly JP. Stroke in a defined elderly population, 1967-1985. A less lethal and disabling but no less common disease. *Stroke* 1997;28:284-290.

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Management of Acute Strokes

Edward Feldmann, MD

We are in the midst of significant change in the management of acute stroke. Two major developments underscore our shift in perspective. First is an explosion of interest in the development of acute stroke therapy, underscored by the success of the NINDS tPA trial demonstrating the effectiveness of tPA in ischemic stroke, when administered under the proper conditions. Second, hospital stroke care units, staffed by specially trained and experienced personnel using care plans based on evidence in the medical literature, have demonstrably improved the care and outcome of patients. Because much of this effort is addressed to patients with ischemic stroke, this review deals mostly with them, but applies as well to some hemorrhage patients.

Prehospital Management

The symptoms of ischemic stroke involve focal neurological dysfunction of sudden onset, with a steady, progressive or fluctuating course. Symptoms include alteration in alertness, seizures, language disturbance, weakness, incoordination, sensory loss, ataxia, visual loss, vertigo, double vision, hearing loss, with or without nausea, vomiting and headache.[1] Differential diagnosis includes intracerebral and subarachnoid hemorrhage, hypoglycemia, drug overdose, seizures, and head trauma.

The entire community - lay persons and health care workers - must cooperate to ensure a rapid and appropriate response to acute stroke. Since effective therapy requires rapid recognition of stroke, a heightened community awareness of its signs and symptoms is essential. Community education for lay and physician communities needs to be carefully developed and put in place. Primary care and specialty physicians should begin to instruct patients and bystanders who recognize the symptoms of stroke to do the following: call 911; do not wait symptoms for resolve; do not attempt to contact a private doctor. Typically, such behaviors delay diagnosis and treatment.

In 1993, the American Heart Association included emergent stroke care as one of its special resuscitation situations for basic and advanced life support.[1] EMS personnel, who correctly identify 75% of acute strokes, [2] must continue to be trained for the diagnosis, transport and treatment of acute stroke. Treatment should include: assuring an airway, monitoring vital signs, looking for evidence of trauma to the head or neck, assessing cardiac status, alertness, seizures, pupils and limb movements.[1] Most importantly, EMS staff should establish a precise time of onset through direct questioning of the patient or bystanders. EMS staff should also prenotify the hospital that a stroke patient is enroute. This saves valuable time by having a stroke team prepared to receive the patient and initiate the steps required for proper emergency room care.

Abbreviations Used:

CT	Computerized tomography
EMS	Emergency Medical Service
ER	Emergency Room
FDA	Food & Drug Administration
ICU	Intensive Care Unit
MI	Myocardial infarction
MRI	Magnetic resonance imaging
NINDS	National Institute of Neurological Diseases and Stroke
PT	Prothrombin time
PTT	Partial thromboplastin time
tPA	Tissue plasminogen activator

Emergency Room Management

The goals of emergency evaluation are: rule out a non-ischemic lesion, describe potential reversibility and likely etiology, predict complications and initiate appropriate treatment.[1] Emergency physicians in a large urban teaching hospital with a comprehensive stroke intervention program can accurately identify patients with stroke.[3] If such results can be documented in other types of hospital settings, emergency room physicians may become key providers of urgent stroke intervention.[3]

Emergency room personnel must be made aware that stroke is as much an emergency as MI or trauma. Airway support and ventilatory assistance should be considered in all stroke patients with depressed levels of consciousness.[1] Oxygen should be administered to hypoxic patients.

Only a few laboratory tests must be immediately performed and evaluated prior to the initiation of acute ischemic stroke treatment. A CT scan of the brain without contrast must be performed, preferably within 15 minutes of ER arrival, to rule out a non-ischemic cause of the patient's symptoms. CT is the test of choice for the distinction between ischemic stroke and intracranial hemorrhage.[1] CT scan is often negative, despite the size or severity of infarction, if obtained within three hours of stroke onset. Early detection of infarction and edema may suggest a poor outcome or predict that hemorrhagic transformation is more likely.[1] In less emergent situations, an MRI can identify posterior fossa ischemic lesions.[1]

If thrombolytic therapy is planned, platelet count, PT and PTT should be obtained, since there are specific exclusion criteria for these laboratory tests.[4] Less emergent are the results to the following, which need not be performed in every patient: electrocardiogram, chest x-ray, cervical spine x-rays, complete blood count, electrolytes, glucose, arterial blood gas, renal and hepatic function tests, lumbar puncture (only in patients with suspected subarachnoid hemorrhage or meningitis, with a normal CT scan), and electroencephalogram (for suspected nonconvulsive status epilepticus).[1]

The initial neurological evaluation should be obtained within minutes of arrival and take no longer than 10 minutes.[1] Preliminary reports suggest that neurological evaluation in the first 6 hours after stroke onset is related to improved functional outcome and shorter hospitalization.[5] Alternative diagnoses to ischemic stroke are suggested by ocular hemorrhages, nuchal rigidity, coma, papilledema and fever.[1]

Intravenous thrombolytic therapy should be considered in all ischemic stroke patients who present within three hours of stroke onset. This treatment has had variable success in clinical trials, reflecting variable agents, dosing, patient selection, ancillary treatment and most importantly, time to treatment after stroke onset.[4] The NINDS study showed that t-PA, 0.9 mg/kg, maximum dose 90 mg, 10% as bolus followed by a one hour infusion of the remainder, improves the outcome of carefully selected patients treated within three hours of stroke onset.[6] Despite a modest increase in the risk of hemorrhage, the drug remains useful in this setting. The risk of bleeding is believed to be unacceptably increased in patients who meet exclusion criteria for treatment.[4]

The FDA has approved the drug for use when appropriate inclusion criteria are met. No data support treatment with other intravenous thrombolytics or in settings other than those described by the NINDS trial. The time of stroke must be reliably ascertained. The three hour window for treatment typically precludes treating patients who first note stroke symptoms upon awakening. The stroke should be diagnosed by a physician with expertise in the diagnosis of stroke and the CT should be read by a physician with expertise at identifying sulcal effacement, mass effect, edema or possible hemorhage, all exclusions for treatment. Otherwise, therapy should be avoided. Other exclusions include: anticoagulation, thrombocytopenia, stroke or serious head injury in the last 3 months, major surgery in the last 14 days, severe hypertension, minimal or improving deficits, prior intracranial hemorrhage, serum glucose abnormalities, recent intestinal or urinary bleeding, or recent myocardial infarction.[4] Emergency facilities to diagnose and treat hemorrhagic complications should be readily available.

Emergency room personnel must be made aware that stroke is as much an emergency as myocardial infarction or trauma.

Intra-arterial thrombolytic therapy has been shown to reopen arterial occlusions, but is more effective for intracranial occlusions than those of the internal carotid or basilar arteries. Its use remains under investigation in clinical trials and should be restricted to physicians and centers with expertise in its administration.[4] There is no evidence that one agent is preferred to another or that intra-arterial therapy is superior or inferior to intravenous therapy, but the risk of bleeding may be lower with intra-arterial treatment. Simultaneous administration of heparin may influence the efficacy of intraarterial thrombolysis, but the risk of bleeding may be higher.[4]

Inpatient Management

The goals of the inpatient phase of management are to: observe the patient for deterioration, prevent complications, institute preventive therapy for recurrent stroke, and begin rehabilitation.[1]

Nearly one of four patients deteriorates in the first two days after admission, but predicting which patients will decline is difficult.[1] Outcome is improved, length of stay is reduced (often to three days for mild strokes), mortality is reduced, complications are reduced and discharge disposition is improved if the patient is admitted to a facility that specializes in the care of stroke.[1,7-10] In hospitals where this care is not available, the physician should consider transfering the patient to a facility that does provides it.[1]

This recommendation - for transfer to facilities that provide a comprehensive approach to stroke care - does not seek to separate community hospitals and tertiary care centers. Indeed, many of the hospitals in acute stroke trials are community hospitals that provide high quality, comprehensive stroke care. The recommendation seeks to elevate the standard of stroke care that patients and physicians should expect at any facility.

After tPA treatment the patient should be admitted to an ICU or an acute stroke care unit to permit frequent neurological asessments and cardiac monitoring.[4,11] Stroke patients commonly harbor ischemic heart disease, which may be symptomatic coincident with the presentation of stroke. Thus, continuous monitoring of cardiac function, looking for ischemia, arrhythmia and heart failure, may be warranted in some patients.[1] The use of preventive therapy for ischemic stroke is held for 24 hours after tPA treatment; patients should not receive aspirin, heparin, warfarin, ticlopidine or other antithrombotic or antiplatelet-aggregating drugs within the first 24 hours after treatment.

Stroke care guidelines and a dedicated stroke unit should be available, not only experienced in the care of ischemic stroke but also employing a

detailed pathway for the management of intracerebral and subarachnoid hemorrhage and transient ischemic attack.[12-14] Such units should provide close monitoring of vital and neurological signs, be staffed by nursing personnel and physicians experienced in the care of stroke patients, and provide safe and early mobilization to prevent deep vein thrombosis, decubiti and contractures. For example, appropriately staffed and experienced units will mobilize a patient out of bed the first day after admission, will initiate early physical therapy, and begin feeding in patients with intact swallowing assessed at the bedside after a water swallow test.[1] Patients who fail this test require tube feeding.

The optimal management of blood pressure in the setting of acute ischemic stroke is unresolved.[1] Lowering of pressure may aggravate ischemia in patients with ischemic stroke and in patients with both hemorrhage and intracranial hypertension.[1] Specific pressures that require treatment have not been identified, but physicians should treat hypertension in stroke patients with active myocardial ischemia, hemorrhagic transformation, renal failure or aortic dissection.[1] In the absence of these, most authorities suggest withholding treatment until mean arterial pressure exceeds 130 mm Hg or systolic pressure exceeds 220 mm Hg.[1] Intravenous nitroprusside and labetalol are the drugs of choice, while oral calcium antagonists should be avoided.[1] Unless thrombolytic therapy is planned, most patients will not require emergent lowering of blood pressure.

The use of a protocol for blood pressure management is particularly important in patients receiving tPA.[4] Authorities recommend aggressive monitoring and treatment when pressures exceed 180 mm Hg systolic or 105 mm Hg diastolic.[4] If possible, central venous cathers and arterial punctures should be avoided. Early placement of an indwelling bladder catheter and insertion of a nasogastric tube should also be avoided in patients receiving tPA.[4] Hypotension and hypovolemia also require aggressive therapy, particularly in patients with vasospasm after subarachnoid hemorrhage.[1]

Deep vein thrombosis prophylaxis should be administered to stroke patients who are immobilized or have leg paralysis.[1] Treatment should consist of subcutaneous heparin. Alternating pressure stockings are used in patients who should not receive anticoagulation. Support stockings are of unproven value.[1] To prevent infection, intermittent bladder catheterization is preferred to continuous catheterization.[1]

Because lower temperatures are associated with smaller infarcts in experimental studies, fever should be aggressively evaluated and treated in stroke patients.[1]

No data support the acute use of heparin, aspirin, ticlopidine or clopidogrel in ischemic stroke.[1] Heparin is commonly administered acutely after stroke, but it has potentially serious complications and is of no clear benefit. Its use depends on the preference of the treating physician. Low-molecular weight heparin[15] and heparinoids are being tested now, as are antiplatelet agents and cytoprotective therapies. The International Stroke Trial reported that aspirin, 325 mg/day, was associated with a small but statistically significant reduction in early stroke recurrence. Many neurologists treat acute stroke with aspirin in patients not receiving heparin or tPA.

Similarly, there is no role for emergent endarterectomy to treat an acute stroke, despite its role in preventing stroke long-term in patients with symptomatic severe carotid stenosis. Most neurologists feel comfortable referring such patients for surgery within a week or two after cerebral infarction, as long as blood pressure is controlled and the volume and clinical deficit resulting from the infarction are not extreme. Some surgeons wait up to six weeks before operating, even in patients with mild deficits.

Cytoprotective strategies under investigation include: calcium channel blockers, free radical scavengers, excitatory amino acid antagonists, antibodies inhibiting leukocyte migration and neurotrophic proteins.[1] In highly selected patients with mild deficits distal to severe carotid stenosis, carotid endarterectomy can be safely performed, but it helps to prevent recurrent stroke rather than to ameliorate the severity of the current stroke.[1] Emergent angioplasty and embolectomy are of no proven benefit at present.[1]

Long-term preventive therapy is more effective if directed at a specific etiology of stroke. Such etiologies can be sought with inpatient carotid and transcranial ultrasound, magnetic resonance arteriography, conventional arteriography, transthoracic and transesophageal echocardiography and Holter monitoring. Serial neuroimaging studies of any type are generally not useful in stable patients where ischemia has already been identified as the source of stroke.[16] In stroke patients under age 50, and in those with repeated strokes of unclear etiology or a familial history of clotting disorder, hypercoagulability testing for less common causes of stroke are warranted.[1]

There are numerous important complications of acute stroke. Neurological complications include: cerebral edema and herniation, hydrocephalus, hemorrhagic transformation and seizures. Treatment of intracranial hypertension and edema include hyperventilation, osmotic diuresis, ventricular shunting when needed, barbiturates, hemicraniectomy and temporal lobe decompression. Survivors of such surgery often have severe residual deficits. Surgical decompression can be particularly useful in patients with large cerebellar infarctions and brainstem compression.[1] Seizures can often be treated successfully with phenytoin, but patients who receive this drug intravenously in loading doses are at risk for arrhythmia and hypotension and require cardiac monitoring. No evidence supports the use of prophylactic anti-seizure medications in patients with ischemic stroke.[1]

About 5% of ischemic stroke patients will develop serious, symptomatic hemorrhagic transformation. The size, location, etiology and treatment

of an acute ischemic stroke will influence the incidence of hemorrhage, with transformation more common in large infarcts, in those presenting with early hypodensity on CT, and in those treated with thrombolytic therapy.[1] Management of hemorrhagic infarction is individualized depending on the severity of symptoms.[1] In patients who bleed at any site after the administration of tPA, blood should be drawn to assess complete blood count, clotting times, platelet count and fibrinogen. Packed red blood cells, cryoprecipitate, platelets and fresh frozen plasma should be made available if needed. For extracranial bleeding, the infusion of tPA is stopped and the bleeding is treated mechanically if possible. For intracranial bleeding, the infusion of tPA is stopped, the fibrinolytic state is corrected and a neurosurgeon is consulted for possible evacuation.

The general medical complications of stroke include: aspiration, pneumonia, myocardial ischemia, arrhythmia, deep vein thrombosis, pulmonary embolism, urinary tract infection, decubitus ulcer, malnutrition, and joint contracture.[1] Complications of acute stroke are clearly reduced when patients receive care in units staffed by physicians, nurses and therapists experienced in the care of acute stroke.

Improving the quality of stroke care also requires the constant monitoring of key events throughout a patient's hospitalization. A minimum set of quality indicators would be relatively simple to monitor and would initiate the complex process of quality improvement. This set should put patient safety first, assess large impact issues, and assess indicators for which reasonably reliable measurment tools exist. This minimum set might include:

Prehospital setting:	Symptoms recognized as stroke, 911 system used
Emergency Room:	Time to evaluate and treat
Inpatient unit:	Stroke care protocol in place

Data from clinical trials and the growing experience with dedicated stroke units have resulted in a wealth of recommendations to improve the care of the patient with acute stroke. These approaches were not known or available a decade ago. As clinical and basic research in the field of acute stroke continues, we anticipate more progress in the decade ahead.

References

1. Adams H, Brott T, Crowell R, et al. Guidelines for the managment of patients with acute ischemic stroke. A statement for healthcare professionals from a special writing group of the Stroke Council, American Heart Association. *Stroke* 1994;25:1901-1914.
2. Kothari R, Barsan W, Brott T, et al. Frequency and Accuracy of Prehospital Diagnosis of Acute Stroke. *Stroke* 1995;26:937-941.
3. Kothari R, Brott T, Broderick JP, Hamilton CA. Emergency Physicians Accuracy in the Diagnosis of Stroke. *Stroke* 1995;26:2238-2241.
4. Adams HP, Brott TG, Furlan AJ, et al. Guidelines for Thrombolytic Therapy for Acute Stroke: A Supplement to the Guidelines for the Management of Patients with Acute Ischemic Stroke. *Circulation* 1996;94:1167-1174.
5. Davalos A, Castillo J, Martinez-Vila E. Delay in Neurological Attention and Stroke Outcome. *Stroke* 1995;26:2233-2237.
6. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med* 1995;333:1581-1587.
7. Kaste M, Palomaki H, Sarna S. Where and How Should Elderly Stroke Patients be Treated? A Randomized Trial. *Stroke* 1995;26:249-253.
8. Jorgensen HS, Nakayama H, Raaschou HO, et al. The Effect of a Stroke Unit: Reductions in Mortality, Discharge Rate to Nursing Home, Length of Hospital Stay, and Cost. *Stroke* 1995;26: 1178-1182.
9. Webb DJ, Fayad PB, Wilbur C, et al. Effects of a Specialized Team on Stroke Care. The First Two Years of the Yale Stroke Program. *Stroke* 1995;26: 1353-1357.
10. Kalra L. Organization of Stroke Services: The Role of Stroke Units. *Cerebrovasc Dis* 1996;6:7-12.
11. Hacke W, Schwab S, DeGeorgia M. Intensive Care of Acute Ischemic Stroke. *Cerebrovasc Dis* 1994;4:385-392.
12. Mayberg MR, Batjer HH, Dacey R, et al. Guidelines for the Management of Aneurysmal Subarachnoid Hemorrhage. *Stroke* 1994;25:2315-2328.
13. Moore WS, Barnett HJM, Beebe HG, Bernstein EF. Guidelines for Carotid Endarterectomy. *Stroke* 1995;26:188-201.
14. Feinberg WM, Albers GW, Barnett HJM, et al. Guidelines for the Management of Transient Ischemic Attacks. *Stroke* 1994;25:1320-1335.
15. Kay R, Wong KS, Ling Y, et al. Low-Molecular Weight Heparin for the Treatment of Acute Ischemic Stroke. *N Engl J Med* 1995;333:1588-1593.
16. Salerno SM, Landry FJ, Schick JD, Schoomaker EB. The Effect of Multiple Neuroimaging Studies on Classification, Treatment, and Outcome of Acute Ischemic Stroke. *Ann Intern Med* 1996;124:21-26.

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Vascular Dementia

Brian R. Ott, MD, and Janet Grace, PhD

Stroke is the second leading cause of dementia, following Alzheimer's disease (AD). Prevalence rates for vascular dementia (VaD) range from 14-47%. Differences in prevalence depend largely on the diagnostic criteria, although higher rates reported for Japanese and predominantly black populations may also reflect cultural, environmental, and genetic influences on vascular risk factors. Approximately 10-15% of dementia cases in the elderly are due to vascular disease, with another 10% or more due to the combined effects of vascular and degenerative disease, i.e."mixed dementia."

Dementia from stroke is heterogeneous due to marked variability in lesions between patients as well as a wide range of underlying pathologies.[1] Table 1 lists the common and unusual diseases producing dementia.

Similar to the exponential rise of AD among the elderly, stroke occurs with increasing prevalence with advancing age, doubling with each decade. The prevalence of cerebrovascular disease over the age of 65 has been estimated to be 5%. Not surprisingly, stroke and AD often coexist in patients with dementia. Complicating this pathologic overlap is the radiologic overlap of subcortical stroke with so-called normal aging effects on the brain that may be related to vascular ischemic changes without actual discrete infarction. Such changes are most vividly seen on T2-weighted magnetic resonance images (MRI). Radiologic interpretations of subcortical hyperintensities on these images are variable and subjective. Large and confluent abnormalities are more likely than very small or punctate changes to be interpreted as ischemic.

Understandably, among experts in the fields of stroke and dementia, there is diagnostic ambiguity and controversy. This review hopes to clarify these controversies and outline current knowledge about the diagnosis, pathophysiology, neuropsychology, and treatment of VaD.

Abbreviations Used:

AIREN	Association l'Internationale pour la Rechereche et l'Enseignement en Neurosciences
AD	Alzheimer's disease
CT	Computed tomography
DSM	Diagnostic and Statistical Manual
ICD	International Classification of Diseases
INR	International normalized ratio
MRI	Magnetic resonance imaging
NIH	National Institutes of Health
NINDS	National Institute of Neurological Diseases and Stroke
VaD	Vascular Dementia

Table 1. Vascular Diseases Associated With Dementia

- Thromboembolic dementia: cardiac and vascular sources
  - Multi-infarct state
  - Single "strategic" infarcts
- Dementia associated with primary cerebrovascular disease
  - Atherosclerosis
  - Lipohyalinosis of small vessels
    - Lacunar dementia
    - Binswanger's disease
  - Cerebral amyloid angiopathy
  - Granular cortical atrophy
  - Other arteriopathies, including inflammatory
- Radiation induced injury
- Hypoxic-ischemic encephalopathy
- Hyperviscosity syndromes
  - Myeloproliferative disorders
  - Proteins, e.g. IgM
  - Lipoproteins
- Hypercoagulable states
  - Malignancy
  - Deficiency states, e.g. protein S, C, antithrombin III
  - Lupus anticoagulant
- Intracranial hemorrhage
  - Chronic subdural hematoma
  - Hemorrhagic infarcts
  - Intracerebral hematomas
  - Amyloid angiopathy with multiple lobar hemorrhages
- Hereditary diseases
  - Amyloid associated vasculopathy
  - CADASIL
- Mixed type dementia
  - Alzheimer's disease plus discrete infarctions
  - Alzheimer's disease with central white matter involvement

Diagnostic Criteria

The accuracy of diagnosis of VaD has lagged behind diagnosis of AD. In 1984 a group of "dementia" experts under the auspices of the National Institutes of Health (NIH) convened to define a standard set of clinical diagnostic criteria for AD. Subsequent postmortem studies from various AD research centers have shown these criteria to have an accuracy rate of approximately 80-90% for probable AD. To date a similar consensus has not been reached or validated for the clinical diagnosis of VaD.

In 1992, the California Alzheimer's Disease Diagnostic and Treatment Centers proposed diagnostic criteria for ischemic VaD designed to parallel the NIH criteria for AD. Under this schema, the diagnosis of VaD is classified as "definite" if there is evidence postmortem of multiple infarcts in a person with dementia. If there is also evidence of AD the diag-

nosis is mixed dementia. Probable VaD requires the presence of 1) dementia, and 2) two or more ischemic strokes by history, examination, computed tomography, or T1-weighted MRI images, or single stroke with a clear relationship to dementia onset, and 3) evidence that at least one of the infarcts is outside of the cerebellum. Periventricular and deep white matter changes on T2-weighted MRI images are regarded as non-diagnostic for probable VaD.[2]

In 1993, the NINDS/AIREN international workshop proposed more encompassing diagnostic criteria, also based on a probability scheme. These criteria include hemorrhagic stroke and global hypoperfusion states as well as strategic infarction and multiple ischemic infarctions. White matter lacunes and "extensive periventricular white matter lesions" on computed tomography (CT) or MRI can be used as evidence of cerebrovascular disease supporting a diagnosis of probable VaD.[3]

The most recently published DSM-IV criteria define VaD as the dementia syndrome in the presence of focal neurologic signs and symptoms or "laboratory evidence" of cerebrovascular disease that are etiologically related to the disturbance. Focal neurologic signs include extensor plantar response, pseudobulbar palsy, gait abnormalities, exaggerated deep tendon reflex, or extremity weakness.

In a recent study comparing the California, NINDS-AIREN, DSM-IV, and International Classification of Diseases (ICD-10) criteria, an unselected sample of 167 elderly persons with dementia were classified under each set of criteria. Concordance was extremely low: only five cases met diagnostic criteria for VaD under all four guidelines. Major difficulties were encountered in classifying the many cases with white matter lesions on their brain imaging studies. In such cases the etiology and likelihood of ischemia as the cause are generally unknown. Furthermore, the different diagnostic guidelines do not have uniform criteria for dementia, and not all include hemorrhagic pathologies or provide for VaD subtypes.[4]

One of the older approaches to diagnosis, still used today particularly in research studies, is a scoring system of factors for VaD. The Hachinski Ischemic Score, originally described in 1975, has undergone several revisions. One of the more popular revisions is that of Rosen et al.[5] Factors and their point scores under this modification include abrupt onset (2), stepwise deterioration (2), somatic complaints (1), emotional incontinence (1), history of hypertension (1), history of stroke (2), focal neurologic symptoms (2), and focal neurologic signs (2). A score greater than four is indicative of VaD. One limitation of such scores: they reduce sensitivity in diagnosing AD, particularly in mixed cases. Furthermore, the ischemic scale is not accurate enough to diagnose dementia of purely vascular origin, due to the common overlap with AD.[6]

... medical therapy at the present time is focused on management of stroke risk factors and symptomatic treatment of neuropsychiatric symptoms.

Mechanisms for Dementia Related to Stroke

The risk of developing dementia increases after stroke. For example, Tatemichi et al. [7] found that the occurrence of ischemic stroke increases the risk of dementia by at least ninefold compared with elderly who are free of cerebrovascular disease. However, not all stroke victims become demented. Cummings[8] estimates that 25-50% of stroke patients eventually develop VaD.

Typically following stroke, the patient suffers acute, often multiple cognitive and functional impairments as well as a decline from previous levels of function. These impairments result from the focal effects of lesions that damage specific cortical and/or subcortical regions. As part of the natural history of stroke, the patient steadily and spontaneously recovers physical and cognitive function until reaching a plateau 3-6 months post-stroke. This course of acute cognitive and functional decline followed by partial or complete recovery does not necessarily constitute a dementia since there is not a continuing, progressive decline of cognitive and functional status. In contrast to this typical course, some stroke victims show progressive cognitive and functional deterioration over time. This heterogenous subset of stroke survivors who have a temporal association of dementia with stroke is the focus of this discussion of VaD.

Tatemichi[9] outlined potential mechanisms of dementia related to stroke, including *location* of cerebral injury, *volume* or extent of cerebral injury, *number* of cerebral injuries or multiplicity, and *co-occurrence* of VaD and AD. Others have emphasized predisposing factors to VaD such as atherosclerosis, hypertension, cardiac disease, and diabetes.

In regard to location, VaD can be classified into cortical and subcortical types based upon the vessels most involved. Stuss and Cummings[10] summarize the types of dementia associated with different size vessel disease (Table 2).

Tatemichi[7] found that dementia was more common among left hemisphere infarction than right hemisphere or brainstem-cerebellar infarction, even when adjusting for aphasia. Of left hemisphere strokes, dementia was most common with infarcts of the limbic system. These strokes involved the left anterior cerebral artery impacting medial frontal cortex and the left posterior cerebral artery impacting ventral-medial temporal lobe. Lacunar infarction was also independently associated with dementia. Location was a more important mechanism than sheer volume of brain damage, but above a critical threshold,

Table 2: Stuss and Cummings: Classification of Vascular Dementia

Vessel Size	Vessels Involved	Type of Dementia	Typical Neurophysical Deficits
Large	Carotid	Cortical	Transcortical aphasia, visuospatial deficits
Large	Anterior, middle, posterior cerebral artieries	Cortical	Apathy, apraxia, amnesia, agraphia, amusia, acalculia, dysprosody
Small	Thalamic branches of posterior cerebral artery	Subcortical	Apathy, amnesia, poor executive function
Small	Lenticulostriate branches of intracranial vessels	Subcortical	Lacunar state: depression, memory loss, poor executive function
Small	Penetrating vessels of surface cortical vessels	Cortical	Binswanger's disease: mood changes, memory loss, poor executive function
Very small	Cortical vessels	Cortical	Confusional state
Large and small	Multiple vessels	Cortical and Subcortical	Combination of above

brain volume may be a determinant of dementia since the brain's compensatory capacities are overwhelmed, resulting in chronic brain failure. A single massive stroke may result in dementia, but the clinical course is not progressive. Loeb et al.[11] found no correlation between volume of brain lesions and dementia, except in patients with unilateral lesions or patients with bilateral cortical and subcortical lesions. Brain atrophy was significantly correlated with dementia.

A third determinant of stroke-related dementia may be number of cerebral injuries. Multiple large infarctions over time produce a stepwise progressive course resulting in "multi-infarct dementia." Multiple infarcts may have a) additive effects, b) multiplicative effects, or c) location-specific effects, e.g. disconnection of white matter pathways in Binswanger's disease.[7] Progressive dementia following a single stroke may be explained by multiplicative effects of subsequent strategically placed subcortical infarctions. These "silent" lesions usually in basal ganglia, white matter, and frontal lobes, may not be noted clinically but are evident on CT or MRI.

Finally, dementia may reflect mixed pathology such as AD and stroke. Tatemichi[9] states that VaD and AD may have "a) additive effects, e.g., stroke deficits superimposed on AD, adding to baseline changes; b) multiplicative effects, e.g., stroke interacts with AD, aggravating mild AD or unmasking preclinical AD; c) amyloid angiopathy associated with AD leading to multiple small infarcts or Binswanger's disease."

Tatemichi et al.[7] using a regression model derived clinical factors which were independently related to dementia three months after acute stroke. Demographic factors such as age, diabetes mellitus, history of prior stroke (but not TIAs), and lacunar infarction were associated with dementia, as were certain neurological signs (including visual neglect, hemiparesis especially if bilateral, presence of frontal release signs, gait impairment, and urinary incontinence).

A number of factors in this study were not found to be associated with increased risk of dementia: hypertension, cardiac disease (prior myocardial infarction, angina, congestive heart failure, atrial fibrillation), hypercholesterolemia, leg claudication, consistent tobacco or alcohol use, and depression. Cardiogenic embolic strokes were least likely to have associated dementia. These findings conflict with previous reports which emphasized predisposing factors in VaD. Further studies of determinants of post-stroke dementia will clarify these issues.

Neuropsychological Aspects of Vascular Dementia

Two approaches have been taken in studying neuropsychological aspects of VaD: 1) comparison to other dementias, especially AD, and 2) comparison within VaD subtypes. While CT or MRI potentially can identify vascular territories involved, and clinical examination can identify functional impairments, neuropsychological evaluation can specify the nature, extent, and progression over time of cognitive impairments associated with cerebrovascular disease.

Several studies have compared the performance of patients with VaD and AD on neuropsychological tests. In general, AD patients show greater impairment in memory and naming,[12] as well as more intrusion errors.[13] Patients with VaD use simpler grammatical structure, more restricted vocabulary, and shorter sentences.[8] Language changes in VaD correlate with overall dementia severity and with ventricular enlargement.

Those with VaD are more impaired on executive functioning, verbal fluency, attention, and visuomotor performance. VaD of the Binswanger type shows less incontinence and gait disturbance than seen in AD, but more cognitive decline.[12] VaD in general shows relatively more severe dysfunction of frontal lobes on positron emission tomography and neuropsychological testing (planning, sequencing, verbal fluency), and more psychiatric symptoms such as emotional lability.[14] While progressive deterioration is seen in both AD and VaD on all cognitive tasks, those with VaD do worse on tasks requiring motor and cognitive speed. Barr et al.[15] found that AD and VaD dementia patients could be correctly classified 77% of the time using tests of naming and memory.

As noted in Table 2, VaD has both cortical and subcortical types, with distinctly different behavioral and neuropsychological profiles.

Cortical VaD is found with large vessel disease such as occlusion of carotid arteries resulting in border zone infarctions or occlusion of anterior, middle, or posterior cerebral arteries. Typically, these result in left hemisphere cortical syndromes such as aphasia, apraxia, alexia, agraphia, and acalculia or in right hemisphere cortical syndromes such as visuospatial deficits, neglect, dysprosody, and anosognosia.

Subcortical VaD is found with small vessel disease. At least three types of small vessel VaD syndromes have been described including thalamic dementia with prominent amnestic features, lacunar state, and Binswanger's disease. Whether leukoariaosis (radiologically defined subcortical white matter ischemic changes) in the absence of clinical stroke is associated with a dementia is still a subject of controversy. Neuropsychological studies of periventricular white matter alterations or leukoariaosis have yielded equivocal results, with some studies demonstrating executive impairment and others finding no cognitive impairment.[16]

Typically in subcortical VaD, neuropsychological deficits are noted in arousal, attentional distribution, set shifting and maintenance, memory retrieval, speed of information processing, and psychomotor control. Mood and motivation are also frequently more disrupted in subcortical vascular syndromes. Involvement of several size vessels can produce a mixed cortical and subcortical clinical picture while inflammatory processes or micro emboli produce diffuse cortical compromise. Frontal syndromes emerge with some subcortical vascular dementias such as lacunar state or Binswanger's disease, since extensive lesioning of subcortical nuclei and association white matter may disconnect cortical zones. Metabolism in frontal cortex appears particularly vulnerable to lesions of subcortical nuclei. The result is a mixed picture of cortical and subcortical features, even when no cortical lesions are evident on neuroimaging.

Neuropsychological status in lacunar state (multiple lacunar infarcts in striatum, internal capsule, thalamus, subthalamic nucleus, and rostral brain stem) has been studied. Individuals with multiple lacunar infarcts reportedly have difficulty shifting mental set, impaired executive function on verbal learning tests, decreased verbal fluency, and apathy.[15] Ishii et al.[17] studied 30 patients with a minimum of six lacunes and no complicating cortical infarcts: 100% had abulia-aspontaneity, 80% dysarthria, 73% incontinence, 67% mood disturbance, 63% lower limb spasticity, and 57% gait abnormalities. Others have found bradyphrenia, cognitive deterioration and mood alterations with lacunar state.[8] In most studies, approximately 30% of patients with multiple lacunar infarctions are reported to have dementia.

Binswanger's disease involves ischemic injury resulting in demyelination of deep white matter, sparing the short arcuate fibers. Again subcortical and frontal neuropsychological features predominate including emotional lability and impaired executive functions. Neuropsychiatric symptoms are associated with extent of white matter ischemia. Typically this disorder occurs in patients with poorly controlled longstanding hypertension. Onset of dementia is usually insidious, and the course is gradually progressive, with or without superimposed acute deficits. Pyramidal signs, rigidity, or gait ataxia are present in 89% of cases.[1]

As VaD is treated less as a unitary phenomenon, distinct neuropsychological profiles may emerge even further. Current research is seeking to identify different etiologies of VaD which involve different vessel systems, potentially producing different neuropsychological profiles.

Treatment

There are both disease specific and disease nonspecific approaches to treatment. Nonspecific treatment seeks to control target neuropsychiatric problems such as depression, agitation, anxiety, psychosis, and sleep disturbance - tpyically employing antidepressant, minor, and major tranquilizer medications. Depression in particular is common in VaD and may be amenable to treatment. Disease specific treatment should include an agent for stroke prophylaxis. Most commonly aspirin is employed in the prevention of stroke from atherosclerotic cerebrovascular disease. For patients with cardioembolic stroke, treatment with oral anticoagulants is problematic. Elderly patients with VaD are at particular risk for hemorrhagic complications due to unreliable follow up with proper dosing and monitoring of therapy, as well as increased risk of falls due to gait impairment. If warfarin is used, low intensity treatment with prothrombin time ratios of 1.3 to 1.5 or INR of 2.0 to 2.7 should be considered.

Treatment of hyperlipidemia and hypertension may reduce risk of heart attack and stroke. Caution should also be exercised in over-vigorous treatment to lower blood pressure below 130-150 systolic in patients with long-standing uncontrolled hypertension, since cognitive deterioration could result.

A number of double-blind placebo controlled trials have examined potential agents for cognitive enhancement of VaD. Although dihydroergotamine mesylate has been available by prescription for treatment of dementia for many years, recent studies have shown fairly clearly that it is ineffective in treating AD. A meta-analysis suggested that patients with VaD may be a subgroup that may benefit to a modest degree from treatment.[18] Doses up to six mg. daily may be necessary for a positive effect. The mode of action for this drug was originally felt to be cerebral vasodilation; however, more recently it has been regarded as a metabolic enhancer or "nootropic."

Several small trials using pentoxifylline have demonstrated improvements in subjective complaints, social isolation, sleep disturbance, and cognition.[19] This drug, a xanthine derivative which decreases blood viscosity, is approved for treatment of peripheral vascular disease symptoms of claudication.

Other drugs with reported benefits in experimental trials include the nootropic oxiracetam, the mucopolysaccharide glycosaminoglycan polysulfate, and the calcium channel blocker nimodipine. Propentofylline has shown promise as an agent for the symptomatic treatment of both AD and VaD.[20] This xanthine derivative drug augments cerebral blood flow through vasodilation and may provide neuroprotection against cerebral ischemia.

While these studies raise hopes for more effective treatment of VaD in the future, medical therapy at the present time focuses on management of stroke risk factors and symptomatic treatment of neuropsychiatric symptoms. Finally, a comprehensive approach to the management of the patient with VaD should include counselling of the patient and caregivers regarding community support services. A useful resource for referral in Rhode Island is the Alzheimer's Association help-line at 941-8522.

References

1. Wallin A, Blennow K. Heterogeneity of vascular dementia: mechanisms and subgroups. *J Geriatr Psychiatry Neurol* 1993;6:177-188.
2. Chui HC, Victoroff JI, Margolin D, et al. Criteria for the diagnosis of ischemic vascular dementia proposed by the State of California Alzheimer's Disease Diagnostic and Treatment Centers. *Neurology* 1992;42:473-480.
3. Roman GC, Tatemichi TK, Erkinjuntti T, et al. Vascular dementia: diagnostic criteria for research studies. *Neurology* 1993;43:250-260.
4. Wetterling T, Kanitz RD, Borgis KJ. Comparison of different diagnostic criteria for vascular dementia (ADDTC, DSM-IV, ICD-10, NINDS-AIREN). *Stroke* 1996;27:30-36.
5. Rosen WG, Terry RD, Fuld PA, et al. Pathological verification of ischemic score in differentiation of dementias. *Ann Neurol* 1980;7:486-488.
6. Fischer P, Jellinger K, Gatterer G, Danielczyk W. Prospective neuropathological validation of Hachinski's ischemic score in dementias. *J Neurol Neurosurg Psychiatry* 1991;54:580-583.
7. Tatemichi TK, Desmond DW, Paik M, et al. Clinical Determinants of Dementia Related to Stroke. *Annals of Neurology* 1993; 33:568-575.
8. Cummings JL, Mahler, M. Cerebrovascular Dementia. In RA Bornstein and G Brown (Eds.) *Neurobehavioral Aspects of Cerebrovascular Disease.* Oxford University Press, New York, NY 1991.
9. Tatemichi TK. How acute brain failure becomes chronic: a view of the mechanisms of dementia related to stroke. *Neurology* 1990; 40: 1652-1659.
10. Stuss DT, Cummings JL. Subcortical Vascular Dementias, in JL Cummings (Ed.) *Subcortical Dementia.* Oxford University Press, New York, NY 1990.
11. Loeb C, Gandolf C, Bino G. Intellectual impairment and cerebral lesions in multiple cerebral infarcts: a clinical-computed tomography study. *Stroke* 1988;19: 560-565.
12. Bennett DA, Gilley DW, Lee S, Cochran EJ. White matter changes: Neurobehavioral manifestations of Binswanger's disease and clinical correlates in Alzheimer's disease. *Dementia* 1994;5:148-152.
13. Almkvist O. Neuropsychological deficits in vascular dementia in relation to Alzheimer's disease: reviewing evidence for functional similarity and divergence. *Dementia* 1994;5:203-209
14. Starkstein SE, Sabe L, Vazquez S, et al. Neuropsychological, psychiatric and cerebral blood flow findings in vascular dementia and Alzheimer's disease. *Stroke* 1996; 27:408-414.
15. Barr A, Benedict R, Tune L, Brandt J. Neuropsychological differentiation of Alzheimer's disease from vascular dementia. *Int J of Geriatric Psychiatry* 1992;7:261-267
16. Libon DJ, Swenson RA, Malmut BL, Scanlon M. Periventricular white matter alterations, dementia and Binswanger's disease. *Developmental Neuropsychology* 1993;9:87-102.
17. Ishi N, Nishara Y, Imamura T. Why do frontal lobe symptoms predominate in vascular dementia with lacunes? *Neurology* 1986;36:340-345.
18. Schneider LS, Olin JT. Overview of clinical trials of hydergine in dementia. *Arch Neurol* 1994;51:787-798.
19. Black RS, Barclay LL, Nolan KA, et al. Pentoxifylline in cerebrovascular dementia. *J Am Geriatr Soc* 1992;40:237-244.
20. Saletu B, Moller HJ, Grunberger J, et al. Propentofylline in adult-onset cognitive disorders: double blind, placebo-controlled, clinical, psychometric and brain mapping studies. *Neuropsychobiol* 1990;24:173-184.

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Stroke Prevention

Janet L. Wilterdink, MD

Stroke encompasses acute brain injury from both hemorrhage and ischemia; yet even within these broad categories, the causes are diverse. Cerebral infarction, for example, may be caused by cardiogenic embolism, thromboembolism from internal carotid artery stenosis, hypertensive small artery occlusive disease, orhypercoaguable conditions, to name a few. Because stroke prevention is largely pathophysiologically specific, the issue is complex. Adding to the complexity is the fact that not all preventive measures are risk-free; hence, individual patients should be evaluated for risk-benefit analyses. A large part of this equation is whether the treatment is for primary or secondary prevention. This discussion describes preventive measures currently used to prevent stroke, focusing on the magnitude of their benefit in stroke prevention in specific subsets of patients.

Atherosclerosis Risk Factor Management

With recent studies showing benefit of surgery, anticoagulants, and new antiplatelet agents for stroke prevention, atherosclerosis risk factor management may be overlooked. Treatable risk factors for atherosclerosis include hypertension, diabetes, tobacco use, and hypercholesterolemia. Modification of these risk factors is known to effect primary and secondary prevention of cardiac disease and also reduces the risk of atherosclerotic ischemic stroke. Hypertension and tobacco use are also major risk factors for both intracerebral and subarachnoid hemorrhage.

Because of its high prevalence as well as its impact on stroke risk (age adjusted relative risk of 3), hypertension is the single most important treatable risk factor for stroke. The percentage of stroke incidence directly attributable to hypertension is about 60%. Hypertension is not only a risk factor of ischemic stroke but is the putative cause of the majority of nontraumatic intracerebral hemorrhage. Its impact on stroke risk is similar in men and women and in all age groups. Both systolic and diastolic hypertension are independent risk factors. Even borderline, isolated systolic hypertension carries a significant independent risk. The Systolic Hypertension in the Elderly Program study demonstrated that in patients over 60 years with isolated systolic hypertension, treatment producing a mean reduction in systolic pressure from 155 mmHg to 143 mmHg led to a 36% reduction in stroke incidence over 4.5 years of followup.[1] Meta-analysis of treatment trials of blood pressure reduction demonstrated a reduction in stroke incidence, with an average blood pressure reduction of 5.8 mmHg producing with a reduction in stroke incidence of 42% over a 2-5 year followup period.[2] Aggressive treatment of hypertension has been credited with the observed decline of stroke incidence and mortality over the past 20 years.

Cigarette smoking is associated with an approximately 50% increased risk for all stroke subtypes and has a strong, dose-response relationship for both ischemic stroke and subarachnoid hemorrhage. Smoking cessation decreases stroke risk. In both the Framingham Heart Study and the Nurses' Health Study, the risk of stroke in former cigarette smokers fell within 1-2 years of smoking cessation. After 5 years, the risk of stroke was similar to persons who had never smoked.[3]

Diabetics have an increased risk of ischemic stroke with a relative risk of about 2. The benefits of aggressive treatment of diabetes, or "tight control" has not been demonstrated for stroke prevention but is generally recommended to prevent other complications of diabetes.

Hyperlipidemia has been directly related to both the presence and degree of atherosclerosis of the internal carotid artery and the circle of Willis, but not directly to stroke incidence. Cholesterol-lowering trials have demonstrated a decrease in the rate of myocardial infarction but not of stroke. The use of antihyperlipidemics in reducing the degree of carotid artery atherosclerosis is currently under investigation. Because stroke-prone individuals are also at risk for coronary heart disease and myocardial infarction, cholesterol-lowering in hypercholesterolemics at risk for stroke is recommended.

Carotid Endarterectomy

Atherosclerosis of the internal carotid artery is associated with 20% of ischemic strokes. In the 1950's, the first endarterectomies were performed with the hope of reducing stroke risk in patients with this disease. This decade has brought the first reported controlled randomized studies that show

Abbreviations Used:

ACAS	Asymptomatic Carotid Atherosclerosis Study
ADP	Adenosine diphosphate
AF	Atrial fibrillation
AIDS	Acquired immune deficiency syndrome
CAPRIE	Clopidogrel vs. Aspririn in Patients at Risk of Ischemic Events
CBC	Complete blood count
ESPS	European Stroke Prevention Study
MI	Myocardial infarction
NASCET	North American Symptomatic Endarterectomy Trial
TIA	Transcient ischemic attack
UK	United Kingdom
VA	Veterans Administration

that this procedure is effective in certain subgroups of patients with cervical carotid atherosclerosis.

In Interim results of the North American Symptomatic Carotid Endarterectomy Trial (NASCET), patients with internal carotid artery stenosis of >70% as measured by angiography who were *symptomatic* benefited from surgery - reducing ipsilateral stroke rate over 2 years from 26% for those without and 9% for those with surgery, a relative risk reduction of 65%. Similar benefit was found for all stroke, major stroke and combined stroke and death. Symptomatic individuals were defined as those with ipsilateral cerebral ischemia, TIA or minor stroke within the previous 120 days.[4]

In the European Carotid Surgery Trial (ECST) interim results for symptomatic patients with 0-29% and 70-99% stenoses, of 778 patients with a 70 - 99% carotid stenosis, 16.8% of medically treated patients and 10.3% of surgically treated patients suffered an ipsilateral stroke or operative death within 3 years of follow up with a relative risk reduction of 39%. Patients with <30% stenosis had a low rate of ipsilateral stroke, 1.3%, which was not improved with surgery.[5] Interim analysis of patients with 30-69% stenosis suggests that at least over a 4 year follow up, patients with intermediate grades of stenosis do not benefit from surgery.[6]

NASCET and ECST have shown that patients with a >70% carotid stenoses and recent ischemic symptoms have a high risk of ipsilateral stroke in the next 2 years, despite good medical therapy and will benefit from endarterectomy provided that the patient is an acceptable surgical risk and the surgeon is experienced. The rate of perioperative stroke and death in NASCET was 5.8%. The risk of ipsilateral stroke in symptomatic patients with more moderate stenosis is lower and may not be improved by surgery. The final results of the ECST and NASCET are awaited to answer this question more definitively.[7]

The VA Trial (Cooperative Studies Protocol 167 of the Department of Veterans Affairs), studying endarterectomy in 444 asymptomatic men with ≥50% carotid stenosis, reported a statistically significant difference in the incidence of combined primary outcome events: ipsilateral TIA, transient monocular blindness and stroke: 24.5% in medical patients and 12.8% in surgical patients. However, when transient events were excluded, the incidence of stroke or stroke plus death did not significantly differ between the treatment groups (41.2% and 44.2%).[8] The high mortality rate in this trial, 33% at 4 years, may have contributed to the low stroke rate and obscured a difference between the treatment groups.

Public survey data have revealed a general ignorance about stroke, especially when compared to heart disease, cancer and AIDS. Most respondents cannot name any risk factors or warning signs for stroke.

The Asymptomatic Carotid Atherosclerosis Study (ACAS) studied asymptomatic patients with ≥60% carotid stenosis defined either by angiography or duplex ultrasound. A statistically significant benefit 4.8% versus 10.6% was found for endarterectomy in the prevention of stroke or perioperative death at 5 years. While not powered to examine gender differences, the study results suggested that the perioperative complication rate was higher and the relative risk reduction was lower in women.[9]

The surgical trials in asymptomatic patients have shown that symptomatic patients with high-grade carotid stenosis have a lower but still substantial risk of cerebral infarction. For selected patients, endarterectomy improves their prognosis for future stroke. Because the absolute benefit from surgery is lower in asymptomatic patients, it is even more critical that the individual's potential risks and benefits be carefully weighed. Also, the surgeon's perioperative complication rate should approximate that (2.3%) demonstrated in ACAS.

Antiplatelet therapy

Activation and aggregation of platelets on the wall of a diseased artery are believed to be important pathophysiologic steps in the development of the arterial thrombi which subsequently cause cerebral infarction. Antiplatelet agents interfere with this process and reduce the risk of stroke. *Aspirin,* the most commonly used antiplatelet agent, inhibits the enzyme cyclo-oxygenase reducing production of thromboxane A2, an important stimulator of platelet aggregation. Other antiplatelet agents have different mechanisms of action.

The Antiplatelet Trialists published a meta-analysis of 145 randomized clinical trials, involving over 100,000 patients which compared antiplatelet therapy to placebo in the prevention of stroke, myocardial infarction (MI), and vascular death among high risk patients. The vast majority of these patients were treated with aspirin. Among the cerebrovascular studies, those studying patients with prior TIA or ischemic stroke, there were 18 studies and 10,000 patients represented. In all high risk patients, there was a 31% risk reduction in nonfatal stroke. Among the cerebrovascular patients, antiplatelet therapy had similar efficacy in secondary stroke prevention as well as in the prevention of MI and vascular death, with a composite risk reduction of 22%. The Antiplatelet Trialists also analyzed patients by gender, over and under the age 65, those with and without diabetes, and those with and without hypertension. In all strata, all patients find a similar magnitude of benefit from antiplatelet therapy for stroke prevention.[10]

Some controversy remains over the appropriate dose of aspirin for stroke prevention. Early studies had

used doses of 1300 mg, chosen somewhat arbitrarily. Later studies in normal volunteers demonstrated complete suppression of thromboxane A2 with daily doses of aspirin between 20 and 50 mg. Complications of aspirin increase with higher doses. In the UK TIA trial gastrointestinal hemorrhage occurred in 1.6% of patients on placebo, 2.6% on 300 mg aspirin, and 4.7% on 1200 mg aspirin. A similar dose relationship is seen for milder gastrointestinal symptoms.[11] Stroke is usually a more serious complication than gastrointestinal hemorrhage. If higher doses of aspirin were more effective than lower doses, the higher incidence of gastrointestinal hemorrhage may be considered an acceptable risk.[12]

The Swedish Aspirin Low Dose Trial was one of the earliest stroke trials to show a benefit of low doses. They compared 75 mg of aspirin with placebo obtaining a 17% relative risk reduction in stroke, MI and vascular death.[13] Despite this clear demonstration of efficacy, it was still unclear that low doses would be as effective as higher doses. The UK TIA trial is the only study to compare conventional versus high dose aspirin in 3 treatment arms: placebo, 300 mg aspirin, and 1200 mg aspirin. The overall event rates were somewhat lower than predicted and they were unable to demonstrate a statistically significant difference in outcome between either dose of aspirin and placebo. Only by combining the treatment arms did they have enough statistical power to prove that aspirin was better than placebo with an overall relative risk reduction of 18% for disabling death and stroke.[11] The Dutch TIA trial randomized 3131 patients to 30 mg versus 300 mg of aspirin and found no statistically significant difference between the number of outcome events in each treatment group.[14] Negative studies are less helpful than positive studies. No difference found does not mean that no difference exists. The larger the study, and the more outcome data - the more the statistical power, and the less the likelihood that large differences between treatment regimens exist. UK TIA trial is consistent with a benefit or detriment of high dose aspirin of between 10-20%. This issue of aspirin dose is still disputed.[12]

The antiplatelet mechanism of action of ticlopidine is not well understood; it has no effect on phosphodiesterase, cyclo-oxygenase or thromboxane A2 production, but inhibits ADP dependent fibrinogen binding. Two major trials have studied ticlopidine in cerebrovascular disease. The Canadian American Ticlopidine Study compared ticlopidine to placebo in patients who had suffered a significant stroke. After 2 years of follow up there was a substantial reduction in stroke, MI, and vascular death with an overall relative risk reduction of 30%.[15] The Ticlopidine Aspirin Stroke Study compared ticlopidine to aspirin in patients with recent TIA or mild stroke. At 3 years of follow up there was a statistically significant difference in the number of stroke events, with a relative risk reduction of 21%.[16] In both studies the effect on men and women appear similar. Although the risk of peptic ulcer disease complications is higher with aspirin therapy, ticlopidine overall is less well tolerated. Rash and diarrhea, while not serious or irreversible, caused most patients to discointinue ticlopidine. A small number of patients discontinued because of cholestatic jaundice. Less common but more serious is neutropenia, which occurred in less than 3% and reached serious levels in less than 1%. This reversible but potentially life-threatening complication requires patients on ticlopidine to be monitored for the first three months of treatment with biweekly CBCs. Because of these complications, the relatively modest increase in efficacy of ticlopidine over aspirin, and its relatively high cost, ticlopidine is generally not considered a first line antiplatelet agent for stroke prevention, but is reserved for those who fail aspirin treatment or who cannot take aspirin.

Clopidogrel is a new antiplatelet agent whose structure and mechanism of antiplatelet effect are similar to ticlopidine. The Clopidogrel versus Aspirin in Patients at Risk of Ischaemic Events (CAPRIE) trial compared outcome events of stroke, MI, and vascular death in 19,185 patients treated with aspirin (325 mg) or clopidogrel (75 mg) who had had a recent stroke, MI or symptomatic peripheral arterial disease. The composite outcome events were slightly but significantly lower (5.3% versus 5.8%) in clopidogrel-treated patients for a relative risk reduction of 8.7%. The subgroup of patients entered into the study because of stroke showed a similar relative risk reduction in composite outcome events which was not statistically significant. Side effects, in particular the incidence of neutropenia, and tolerability appeared similar in both treatment arms. The investigators concluded that clopidogrel is at least as safe as 325 mg aspirin and appears safer than ticlopidine and is an effective new antiplatelet agent for use in atherothrombotic disease.[17] The drug is not yet approved for use in this country.

Dipyridamole' s antiplatelet action comes from inhibition of phosphodiesterase. In general, it has an excellent safety and tolerability profile. The Antiplatelet Trialists analyzed 14 trials that compared the combination of dipyridamole plus aspirin versus aspirin alone: the trials found no difference in the composite incidence of nonfatal stroke, nonfatal MI and vascular death.[10] The recently published second European Stroke Prevention Study (ESPS-2) randomized 6602 patients who had experienced a recent transient ischemic attack or ischemic stroke to four treatment groups: 25 mg aspirin + 200 mg dipyridamole, 200 mg dipyridamole, 25 mg aspirin, and placebo, each given twice daily. Dipyridamole was given as Persantin® Retard 200 mg, a sustained release tablet. Both dipyridamole monotherapy and aspirin monotherapy had an independent and significant effect in preventing the recurrence of stroke with relative risk reductions of 16% and 18% respectively. The combination of dipyridamole plus aspirin was additive, producing a 37% relative risk reduction in stroke compared to placebo.

Compared with aspirin alone, the combination therapy was superior, producing a 23% relative risk reduction in stroke.[18] It is possible that the higher dose of dipyridamole and different preparation than used in previous trials accounted for its greater efficacy in ESPS-2 than had been shown previously. The trial has also been criticized for using a very low dose of aspirin, which may explain the lower efficacy of aspirin monotherapy compared to combination dipyridamole and aspirin. This and the fact that ESPS-2 results appear disparate from previous studies suggest that another confirmatory trial may be required before aspirin-dipyridamole combination therapy gains widespread use.

Anticoagulation therapy

While antiplatelet therapy is the accepted treatment method for prevention of atherothrombotic stroke, anticoagulation is reserved for stroke prevention in patients with hypercoaguable conditions and for prevention of cardioembolic stroke. Patients with prosthetic valvular disease and recent anterior wall MI are generally treated with warfarin for primary prevention of stroke. Other cardiac conditions that may lead to thrombus formation and embolism include cardiomyopathy, valvular disease, nonbacterial thrombotic endocarditis and atrial myxoma. The use of warfarin versus aspirin in the prevention of atherothrombotic stroke is currently under investigation.

The most common cause of cardioembolic stroke, nonvalvular atrial fibrillation (AF) carries a substantial risk of cerebral infarction with a relative risk of 12. The use of anticoagulation for stroke prevention in AF has recently been better defined. Six randomized, controlled clinical trials have compared warfarin or aspirin to placebo for the primary or secondary prevention of stroke: the Copenhagen AFASAK study, Stroke Prevention in Atrial Fibrillation Study, Boston Area Anticoagulation Trial for Atrial Fibrillation, European Atrial Fibrillation Trial, Veterans Administration Atrial Fibrillation Cooperative Study, and the Canadian Atrial Fibrillation Anticoagulation Study. In the aggregate, control patients had stroke event rates of 4.5% per year (3.0-7.0) compared to 1.7% per year (0.2-3.4) in warfarin-treated patients, a relative risk reduction of more than 60%. Serious hemorrhages occurred at a rate less than 2% per year.[19]

The Stroke Prevention in Atrial Fibrillation Trial II compared warfarin to aspirin (325 mg daily) in patients stratified by age, looking at the combined outcome of stroke and systemic embolism. Patients ≤75 years old treated with warfarin had a lower event rate, 1.3% per year, compared with 1.9% per year in aspirin treated patients. The absolute rate of primary events in "low risk" patients (those without hypertension, recent heart failure or prior thromboembolism) ≤75 years old given aspirin was 0.5% per year. In older patients, the risk of outcome events was higher but was also reduced by warfarin: 3.6% per year versus 4.8% per year. Older patients also had a significantly higher risk of major hemorrhages on warfarin (4.2% annually) compared with younger patients (1.7% annually).[20] Overall, warfarin is recommended over aspirin for primary prevention of stroke in patients with AF, except in the low risk subgroup (no hypertension, recent heart failure or prior thromboembolism) under 75 years. Patient age and other risk factors should be considered when deciding on anticoagulation therapy and its intensity.

Patient Education

Public survey data have revealed a general ignorance about stroke, especially compared to heart disease, cancer and AIDS. Most respondents cannot name any risk factors or warning signs for stroke. The good news is that the media has launched an extensive campaign to educate the public about risk factors for heart disease - a campaign that has likely reduced the incidence of stroke. Nonetheless it is critical that the public, especially individuals who are stroke-prone, i.e, with atherosclerosis risk factors (elderly, hypertensive, diabetic, smoker, hypercholesterolemic), with heart disease, atrial fibrillation or carotid bruit not only have the preventive measures outlined above but also be educated on the symptoms of transient ischemic attack and early stroke; the former indicates a patient with a particularly high risk of stroke in whom further intervention or more aggressive intervention is required. Also as discussion in this journal will show, early intervention in acute stroke is critical for acute stroke treatments to be successful.

References

1. SHEP Cooperative Research Group. Prevention of stroke by antihypertensive drug treatment in older persons with isolated systolic hypertension. Final results of the Systolic Hypertension in the Elderly Program (SHEP). *JAMA*. 1991;265.
2. Collins R, Peto R, MacMahon S, et al. Blood pressure, stroke, and coronary heart disease. Part 2. Short-term recutions in blood pressure: overview of randomised drug trials in their epidemiological context. *Lancet*. 1990;335:827-38.
3. Kawachi I, Colditz GA, Stampfer MJ, et al. Smoking cessation and decreased risk of strok in women. *JAMA*. 1993;269:232-6.
4. North American Symptomatic Carotid Endarterectomy Trial Collaborators. Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. *NEJM*. 1991;325:445-53.
5. European Carotid Surgery Trialists' Collaborative Group. MRC European Carotid Surgery Trial: interim results for symptomatic patients with severe (70-99%) or with mild (0-29%) carotid stenosis. *Lancet*. 1991;337:1235-43.
6. European Carotid Surgery Trialists' Collaborative Group. Endarterectomy for moderate symptomatic carotid stenosis: Interim results from the MRC Euorpean Carotid Surgery Trial. *Lancet*. 1996;347:1591-3.
7. Easton JD, Wilterdink JL. Carotid endarterectomy: trials and tribulations. *Ann Neurol*. 1994;35:5-17.
8. Hobson R, Weiss D, Fields W, et al. Efficacy of carotid endarterectomy for asymptomatic carotid stenosis. *NEJM*. 1993;328:221-7.
9. Executive committee for the asymptomatic carotid atherosclerosis study. Endarterectomy for asymptomatic carotid artery stenosis. *JAMA*.

1995;273:1321-8.
10. Antiplatelet Trialists' Collaboration. Collaborative overview of randomised trials of antiplatelet therapy-I: Prevention of death, myocardial infarction, and stroke by prolonged antiplatelet therapy in various categories of patients. *BMJ*. 1994;308:81-106.
11. UK TIA Study Group. The United Kingdom transient ischaemic attack (UK-TIA) aspirin trial: final results. *J Neurol Neurosurg Psych*. 1991;54: 1044-54.
12. Dyken ML, Barnett HJM, Easton JD, et al. Low-Dose Aspirin and Stroke "It ain't necessarily so". *Stroke*. 1992;23:1395-9.
13. The SALT Collaborative Group. Swedish aspirin low-dose trial (SALT) of 75 mg aspirin as secondary prophylaxis after cerebrovascular ischaemic events. *Lancet*. 1991;338:1345-9.
14. The Dutch TIA Trial Study Group. A comparison of two doses of aspirin (30 mg vs 283 mg a day) in patients after a transient ischemic attack or minor ischemic stroke. *N Engl J Med*. 1991;325:1261-6.
15. Gent M, Easton JD, Hachinski V, et al. The Canadian American ticlopidine study (CATS) in thromboembolic stroke. *Lancet*. 1989;i:1215-20.
16. Hass WK, Easton JD, Adams HP, et al. A randomized trial comparing ticlopidine hydrochloride with aspirin for the prevention of stroke in high-risk patients. *New Engl J Med*. 1989;321:501-7.
17. Caprie Steering Committee. A randomised, blinded, trial of clopidogrel versus aspirin in patients at risk of ischaemic events (CAPRIE). *Lancet*. 1996;348:1329-39.
18. Diener HC, Cunha L, Forbes C, Sivenius J, Smets P, Lowenthal A. European Stroke Prevention Study 2. Dipyridamole and acetylsalicylid acid in the secondary prevention of stroke. *J Neurol Sci*. 1996;143:1-13.
19. Laupacis A, Albers G, Dalen J, Dunn M, Feinberg W, Jacobson A. Antithrombotic therapy in atrial fibrillation. *Chest*. 1995;108:352S-359S.
20. Connolly S, for the Atrial Fibrillation investigators. Warfarin versus aspirin for prevention of thromboembolism in atrial fibrillation: Stroke Prevention in Atrial Fibrillation II Study. *Lancet*. 1994;343:687-91.

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Stroke Research: Recent and Future

J. Donald Easton, MD

Until very recently, physicians didn't need to know a great deal to provide the best care available to patients with stroke. The situation is rapidly changing. This article will highlight a few of those changes - including key findings from recent research for prevention and treatment of stroke, and an update on ongoing clinical trials.

RECENT PREVENTION

We recently learned that warfarin prevents strokes in patients with nonvalvular atrial fibrillation (AF) , but major hemorrhages occur in a significant proportion of patients treated.[1-6] Many AF patients, at low risk for stroke, don't need warfarin; that is, they have more to lose than to gain.[7] Other identifiable subgroups at very high risk for stroke should clearly take the risk of bleeding. Some should be treated only with aspirin.[8] We must know the details of the six atrial fibrillation trials to select the optimal care for our stroke-threatened patients.[1-6]

Prior to 1996 most clinicians used only aspirin or ticlopidine for preventing atherothrombotic strokes.[9] In 1996 we learned that clopidogrel is more effective than aspirin in preventing atherothrombotic strokes and myocardial infarctions and that dipyridamole (Persantine®) added to aspirin probably prevents these strokes better than aspirin alone.[10, 11]

It has been clear since 1991 that carotid endarterectomy is highly effective for preventing strokes in patients with a recent TIA or minor stroke and >70% stenosis of the ipsilateral carotid artery.[12] These patients seem not to benefit if the stenosis is <50% (measured by the same technique).[13] In 1995 we learned that carotid endarterectomy also benefits patients without symptoms but the benefit is very small.[14] Since women seem to have a higher operative morbidity and mortality, the benefit to them is minimal.

Epidemiologists posit no clear link between blood cholesterol and is-

Abbreviations Used:

AF	Atrial fibrillation
Anti-ICAM-1	Intercellular adhesion molecule
ATP	Adenosine triphosphate
CAFA	Canadian atrial fibrillation anticoagulation study
CAPRIE	Clopidogrel versus aspirin in patients at risk of ischaemic events
CL	Chloride
CT	Computerized tomography
EAFT	European Atrial Fibrillation Trial
EAST	Enlimomab Acute Stroke Trial
ECASS	European Cooperative Acute Stroke Study
ESPS-2	European Stroke Prevention Study
GM1	Monosialoganglioside
INR	International normalized ratio
K	Potassium
NASCET-2	North American Symptomatic Carotid Endarterectomy Trial-2
NMDA	n-methyl-d-aspartate
rt-PA	Recombinant tissue plasminogen activator
TIA	Transient ischemic attack
TOAST study	Trial of ORG 10172 in Acute Stroke Treatment

chemic stroke. Nevertheless, in 1994 a large study of a cholesterol lowering drug in patients with coronary heart disease showed a 36% relative risk reduction in stroke favoring the drug.[15]

Acute Treatment

In 1995 the ECASS trial reported the efficacy and safety of intravenous rt-PA in acute ischemic stroke: patients treated within 6 hours with 1.1 mg/kg had a higher mortality than those given placebo.[16] Then a landmark study showed that patients treated within 3 hours with 0.9 mg/kg tPA, and with a carefully interpreted CT scan showing no signs of a large area of infarction, had lower mortality and strikingly less long-term disability.[17] Again, certain treatments are highly valuable for some patients and of no value, or even harmful, for others.

Heparin never has proven beneficial for acute cerebral infarction. In fact, the limited data suggests it is not beneficial. In 1996, early results of a large multinational trial showed that subcutaneous heparin (12,500u or 25,000u daily) did not reduce death or dependency after 14 days of follow-up (in press). The serious hemorrhages more than counter-balanced any benefit from reduced ischemic damage. We will know soon whether recovery at 6 months is improved in patients treated with heparin. This issue is germane since results of another study, published in 1995, showed that nadroparin (a low molecular weight heparin) was substantially better than placebo in reducing disability measured 6 months after the stroke, even though the benefit was not observed at 14 days.[18]

Future Measures: Prevention

Like heparin, warfarin has never been proven beneficial for prevention of atherothrombotic stroke. The future promises answers to the questioned value of warfarin. In 1996, one large trial comparing warfarin (INR 3.0 to 4.5) to aspirin for prevention of recurrent stroke was stopped early due to serious bleeding in the warfarin group (in press). This trial may begin again using a lower intensity of anticoagulation. A second large trial, this one comparing warfarin (INR 1.4 to 2.8) to aspirin, should tell us whether warfarin or aspirin is better in preventing recurrent atherothrombotic stroke.

Another large trial will begin in 1997 comparing clopidogrel plus aspirin to aspirin alone for the prevention of stroke, myocardial infarction and vascular death in patients with TIA and minor stroke.

The results of NASCET-2(North American Symptomatic Carotid Endarterectomy Trial-2) will become available in 1998. We will then know whether endarterectomy is valuable for symptomatic patients with carotid stenoses in the 50-69% range.

... we see that certain treatments are highly valuable for some patients and of no value, or even harmful, for others.

Angioplasty and stenting, widely used in coronary arteries, are beginning to be used in the carotid arteries. One trial involving 700 patients is underway to analyze the short-term safety and efficacy of carotid angioplasty/stenting, compared to endarterectomy, in patients with TIA or minor stroke and 60-99% carotid stenosis. Other groups are presently organizing additional major trials to assess the same issues plus the long-term durability of angioplasty/stenting, relative cost of the two procedures, and quality of life for patients undergoing the two treatments. One of these groups is ours.

Acute Treatment

The long-term outcome of patients in the International Stroke Trial will clarify the value (or lack thereof) of heparin in acute stroke. A larger trial of nadroparin will clarify its value in acute stroke. Similarly, the TOAST study will show the effect of another low molecular weight heparin in acute stroke.[19]

Although tPA is clearly beneficial under the restricted circumstances noted above, its value would be enhanced if the time to treatment could be lengthened. A new trial comparing tPA to placebo for patients 3-5 hours post-onset of their ischemic stroke is underway.

In addition to the efforts to reduce thrombosis with antithrombotics, and improve recanalization through thrombolysis, many drugs aimed at protecting neurons, glia and endothelial cells from ischemic injury too are being studied in clinical trials. Other molecules are being tested for their ability to limit cell injury and enhance recovery. These include calcium channel blockers, n-methyl-d-aspartate (NMDA) inhibitors, and free radical scavengers. To make sense of these multiple approaches to neuronal protection therapy, a brief summary of some of the events involved in ischemic injury follows.

Consequences of Ischemia

Transient ischemia is followed initially by hyperemia, later by delayed hypoperfusion. Whether delayed hypoperfusion is important in determining ischemic damage is debated. However, hypoglycemia leads to an almost identical post-insult hypoperfusion.

Since ischemia is a disorder of the cerebral circulation, the basic defects are shortage of oxygen (and substrate) and failure to remove metabolic waste products. With severe ischemia, adenosine triphosphate (ATP) levels fall to less than 5% of control values within 5 to 7 minutes after onset. With the failure of energy-dependent ionic pumps, sodium, chloride, and calcium influx, and potassium efflux occur. As a result of ATP depletion and calcium influx, lipolytic and proteolytic reactions are enhanced. Membrane depolarization and calcium influx induce presynaptic release of transmitters. Perhaps the most significant neurochemical change with respect to mechanisms of selective neuronal necrosis is the increase in extracellular levels of the excitotoxic amino acids, glutamate and aspartate.

The rise in the concentration of polyenoic free fatty acids and the uptake of K+ and Cl- into glial cells lead

to edematous expansion of astrocytic processes, a swelling most marked in areas where neurons are maximally affected. This swelling, and the consumption of oxygen by glial cells, further compromise the supply of oxygen and glucose to neurons. In neurons, perhaps also in glial cells, maintenance or resupply of oxygen leads to oxidation of arachidonic acid along the cyclo-oxygenase and the lipo-oxygenase pathways with formation of prostaglandin-like substances and leukotrienes, respectively. The former may contribute to microcirculatory problems, e.g., by formation of vasoconstrictor thromboxanes; alternatively, inactivation of prostacyclin synthetase may deprive the vessels of an endogenous vasodilator. However, products of the lipo-oxygenase pathway or free radicals generated during the oxidative conversion of arachidonic acid may be even more important in causing vascular and neuronal damage.

During complete ischemia, the amount of lactic acid formed is determined by pre-ischemic tissue stores of glycogen and glucose, the latter being directly related to the plasma glucose concentrations. During severe ischemia, persisting glucose can cause tissue lactate levels to rise excessively. Under certain circumstances, persistent stimulation of anaerobic glycolysis, possibly due to damage incurred by mitochondria, may occur in the recovery period after ischemia. Profound lactic acidosis leads to pan-necrosis of brain tissue.

Clearly, efforts must be directed toward measures that break the destructive cascade at one or more points. It seems justified, therefore, to focus attention on NMDA and Ca^{+2} blockers, on phospholipase and lipo-oxygenase blockers, and on free radical scavengers. Furthermore, it appears necessary to redirect interest toward measures that decrease tissue acidosis and ameliorate swelling of perineuronal and perivascular glial processes and infiltration of leukocytes and release of their harmful products. Finally, certain growth factors may limit cell damage and enhance repair so recovery is improved.

Only a couple of examples of trials aimed at modifying the cascade of events leading to ischemic damage will be described because there have been no important successes yet.

An early randomized trial using monosialoganglioside (GM1) vs placebo in acute hemispheric stroke showed no benefit for this putative neuroprotective drug.[20]

Early trials with the calcium-blocker nimodipine gave mixed results, but in the aggregate showed no benefit.[21] Attention then shifted to an earlier step in the excitotoxin-induced injury, inhibition of the NMDA receptor. The first large trial involved selfotel, a competitive NMDA antagonist. This was a multicenter, randomized, double-blind, parallel trial comparing efficacy and safety of selfotel with placebo in patients with acute ischemic stroke, which began in late 1994 and expected to enter 2,000 patients. However, the External Data Safety and Monitoring Committee stopped the trial early because of increased mortality in the group treated with selfotel. Parenthetically, a similar multicenter, randomized, double-blind trial comparing the efficacy and safety of 4 iv bolus injections of 5 mg/kg of selfotel with placebo in intubated severe closed-head traumatic brain injured patients was stopped for the same reason.

The Enlimomab Acute Stroke Trial (EAST) is a double-blind, randomized, placebo-controlled trial of the efficacy and safety of enlimomab (an antibody to an intercellular adhesion molecule, Anti-ICAM-1) compared to placebo administered within 6 hours of the onset of stroke symptoms, for treatment of acute ischemic stroke. It enrolled 600 patients and will measure the functional recovery at 3 months. The results will be reported soon.

Conclusion

Changes in behavior and new medications for treating hypertension and hypercholesterolemia are dramatically reducing the risk of stroke and other atherothrombotic vascular outcomes. Wider use of aspirin and the discovery of new antiplatelet agents, and appropriate use of carotid endarterectomy, are similarly reducing stroke. Many cardioembolic strokes now are preventable. We also have learned which patients are at high enough risk to warrant the risks and costs of the various treatments.

Thrombolytic agents were tried in several studies over 30 years. Even in this decade many trials failed due to harm from intracerebral hemorrhage. Not until 1995 was the proper use of thrombolysis worked out; attempts are now being made to expand its use. Discovery of new drugs and learning how to use them and scientifically study them is finally paying off. Even effective treatments must be applied properly - or they can do more harm than good, and their cost can be prohibitive.

Once ischemia is underway, it is harder to prevent brain damage. Recanalization in the early hours works. Many treatments to prevent cellular damage work in animals. So far, they have not worked in man. It seems likely that some of this failure has to do with "too little, too late." While success with thrombolysis took 30 years, neuronal protection therapy will probably advance more rapidly. When it does, we will have to know even more in order to treat our stroke-threatened and stroke patients appropriately.

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All of the new information described here came from years of basic research followed by well-designed and conducted clinical investigation. This is how advances in medicine are made!

References

1. Boston Area Anticoagulation Trial for Atrial Fibrillation Investigators. The effect of low-dose warfarin on the risk of stroke in patients with nonrheumatic atrial fibrillation. *N Engl J Med* 1990; 323:1505-1511.
2. Connolly SJ, Laupacis A, Gent M, et al. Canadian atrial fibrillation anticoagulation (CAFA) study. *J Am Coll Cardiol* 1991; 18:349-355.
3. EAFT (European Atrial Fibrillation Trial) Study Group. European Atrial Fibrillation Trial: Secondary prevention of vascular events in patients with nonrheumatic atrial fibrillation and recent transient ischemic attack or minor ischemic stroke. *Lancet* 1993; 342:1255-1262.
4. Ezekowitz MD, Bridgers SL, James KE, et al. Warfarin in the prevention of stroke associated with nonrheumatic atrial fibrillation. *N Engl J Med* 1992; 327:1406-1412.
5. Petersen P, Boysen G, Godtfredsen J, et al. Placebo-controlled, randomized trial of warfarin and aspirin for prevention of thromboembolic complications in chronic atrial fibrillation. *Lancet* 1989; 1:175-179.
6. Stroke Prevention in Atrial Fibrillation Investigators. Stroke prevention in atrial fibrillation study: final results. *Circulation* 1991; 84:527-539.
7. Atrial Fibrillation Investigators. Risk factors for stroke and efficacy of antithrombotic therapy in atrial fibrillation. Analysis of polled data from five randomized controlled trials. *Arch Int Med* 1994; 154:1449-1457. [Erratum Arch Intern Med 1994;154:2254.]
8. Stroke Prevention in Atrial Fibrillation Investigators. Warfarin versus aspirin for prevention of thromboembolism in atrial fibrillation: Stroke Prevention in Atrial Fibrillation II Study. *Lancet* 1994; 343:687-691.
9. Antiplatelet Trialists' Collaboration. Collaborative overview of randomised trials of antiplatelet therapy—I: Prevention of death, myocardial infarction, and stroke by prolonged antiplatelet therapy in various categories of patients. *BMJ* 1994; 308:81-106.
10. CAPRIE Steering Committee. A randomized, blinded trial of clopidogrel versus aspirin in patients at risk of ischaemic events (CAPRIE). *Lancet* 1996; 348:1329-1339.
11. ESPS-2 Working Group. European Stroke Prevention Study 2: Dipyridamole and acetylsalicylic acid in the secondary prevention of stroke. *J Neurol Sci* 1996:(in press).
12. North American Symptomatic Carotid Endarterectomy Trial Collaborators. Beneficial effect of carotid endarterectomy in symptomatic patients with high-grade carotid stenosis. *New Engl J Med* 1991; 325:445-53.
13. European Carotid Surgery Trialists' Collaborative Group. MRC European Carotid Surgery Trial: interim results for symptomatic patients with severe (70-99%) or with mild (0-29%) carotid stenosis. *Lancet* 1991; 337:1235-1243.
14. Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. Endarterectomy for asymptomatic carotid artery stenosis. *JAMA* 1995; 273:1421-1428.
15. Scandinavian Simvastatin Survival Study Group. Randomised trial of cholesterol lowering in 4,444 patients with coronary heart disease: the Scandinavian Simvastatin Survival Study (4S). *Lancet* 1994; 344:1383-1389.
16. Hacke W, Kaste M, Fieschi C, et al. Intravenous thrombolysis with recombinant tissue plasminogen activator for acute hemispheric stroke. *JAMA* 1995; 274:1017-1025.
17. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med* 1995; 333:1581-1587.
18. Kay R, Wong KS, Yu YL, et al. Low-molecular-weight heparin for the treatment of acute ischemic stroke. *N Engl J Med* 1995; 333:1588-1593.
19. Adams HP, Jr,, Woolson RF, Biller J, Clarke W. Studies of Org 10172 in patients with acute ischemic stroke. TOAST Study Group. *Haemostasis* 1992; 22:99-103.
20. Lenzi GL, Grigoletto F, Gent M, et al. Early treatment of stroke with monosialoganglioside GM-1: efficacy and safety results of the Early Stroke Trial. *Stroke* 1994; 25:1552-1558.
21. Trust Study Group. Randomised, double-blind, placebo-controlled trial of nimodipine in acute stroke. *Lancet* 1990; 336:1205-1209.

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The Creative Clinician: Case of the Month

The practice of medicine is an art, not a trade; a calling, not a business ..." – William Osler, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

First the Chicken, Then the Egg; the Heartburn Came Later

Arthur Williams, MD

This 37 year-old man went to bed feeling well, but awoke with acute diarrhea. Over eight hours, he reported 10 episodes of watery, non-bloody diarrhea, and complained of cramping, non-localizing abdominal pain relieved by defecation. Later in the day he developed chills, fevers, and anorexia. When he came to the hospital, he denied vomiting, chest pain, shortness of breath - but did report dizziness and headache as the day progressed.

He had no past medical problems, and was taking no medications. His family history was unremarkable. Two days earlier, however, he had eaten cooked (but maybe not adequately) chicken and an unrefrigerated egg sandwich.

The Initial Examination

When first seen, the patient had a fever of 38.5 In the supine position, his blood pressure was 140/74 mm Hg; his heart rate was 80 beats per minute. Upon standing, his blood pressure dropped to 126/70 mm Hg; his heart rate rose to 100 beats per minute. His heart examination showed a regular rate with no murmurs or rubs. Abdominal exam revealed hyperactive bowel sounds. It was soft with mild epigastric tenderness, and no masses or organomegaly. Rectal examination showed no masses; the stool had occult blood.

Initial laboratory data included a WBC 13,600/nl with 74% neutrophils, 8% bands, 10% lymphocytes and 10% monocytes. Hemoglobin was 15.3 gm/dl. Platelet count, electrolytes, and renal function - all were normal. Wright's stain of the stool revealed fecal polymorphonuclear neutrophils (PMNs). Radiographic studies included normal abdominal and chest X-rays. Blood and stool cultures were sent.

Post-Admission Chest Pains

Once admitted to the hospital, the patient received saline infusions. That night he experienced two hours of retrosternal chest pain with a respirophasic component. The initial EKG (Figure 1) showed inferior and precordial ST elevation. The heart and lung sounds were normal. After the patient took a nonsteroidal, anti-inflammatory agent, the pain abated.

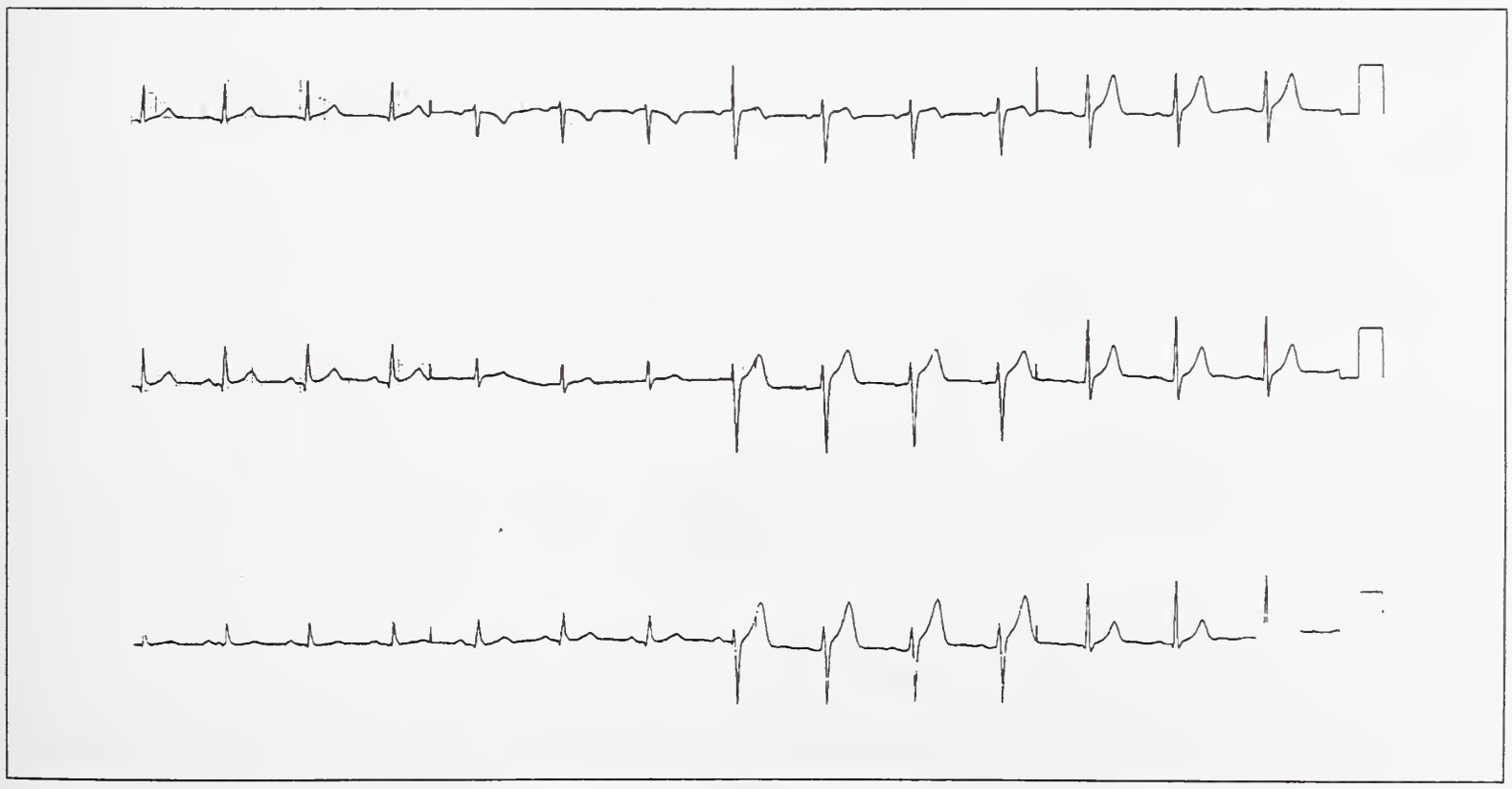

Fig. 1

Serial EKGs over the next 24 hours (Figures 2,3) showed normalization of the ST segments but progressive inversion of the precordial T waves. Creatinine phosphokinase (CPK) rose to 760 I.U. with a myocardial band (MB) index of 4.8%

The Differential Diagnosis

This healthy man, admitted to the hospital with diarrhea, subsequently developed chest pain, with EKG and laboratory evidence of myocardial injury.

The diarrhea, developing soon after meals of chicken and unrefrigerated eggs, was most likely infectious in etiology. The presence of PMNs and occult blood in the diarrheal stool suggested ab inflammatory process. Common pathogens causing inflammatory diarrhea include *Shigella* sp, *Salmonella* sp, *Campylobacter jejuni*, *Enterohemorrhagnic Echeresichia Coli*, *Vibrio parahemolyticus* , and *Yersinia enterocolitica*. Each of these organisms has a prolonged (>16 hours) incubation period which made them etiologic candidates in this patient. The food source was likely to be poultry and eggs; thus, *Salmonella* sp, *Campylobacter jejuni*, *E. coli* , or *Shigella* sp was a possibility.

The chest pain, EKG abnormalities and elevated CPK with MB present were consistent with acute myocardial infarction (AMI). However, a young patient without risk factors was an unlikely candidate for an AMI.

A plausible diagnosis was myopericarditis which could be caused by an enteric pathogen. The chest pain was respirophasic and NSAID responsive, as would be expected with myopericarditis. The patient did not have a pericardial friction rub which, if present, would have further supported the diagnosis of myocarditis (but these rubs are often transient).

The Evaluation

Campylobacter jejuni was isolated from the patient's stool on a selective medium at 42°C in a microaerophilic environment. No other organisms were identified. Serum antibodies to *Campylobacter jejuni* were elevated. The patient underwent an echocardiogram which revealed a normal pericardium, normal valves, and normal ventricular function. The patient underwent stress thallium testing. He exercised 12 minutes on the Bruce protocol with a maximum heart rate of 188 beats per minute and blood pressure of 190/100 mm Hg. Thallium images and EKG tracings did not reveal ischemic changes. The clinical diagnosis was *Campylobacter jejuni* enteritis with myopericarditis.

Discussion

Campylobacter jejuni is a motile, comma-shaped, gram negative Rod. Acute enteritis is the most common presentation of infection. While diarrhea can vary from watery to grossly bloody, in most patients it is profuse, with abdominal cramps. Constitutional symptoms occur as a prodrome or coincide with the intestinal phase.

How do people get the infection? In the United States, most people who are infected eat undercooked poultry (50-70%).[1] Chicken carcasses are universally contaminated with *campylobacter*. When people eat barbecued chicken that is charred on the outside, pink near the bones (or when they use utensils that have come in contact with raw poultry), they may be ingesting enough *Campylobacter jejuni* to cause infection. Other sources of *Campylobacter jejuni* include dairy products (especially unpasteurized milk), contaminated water, infected domestic pets and foods from other animals. Although the enteritis is often self-limiting, the infections can be prolonged or relapsing.

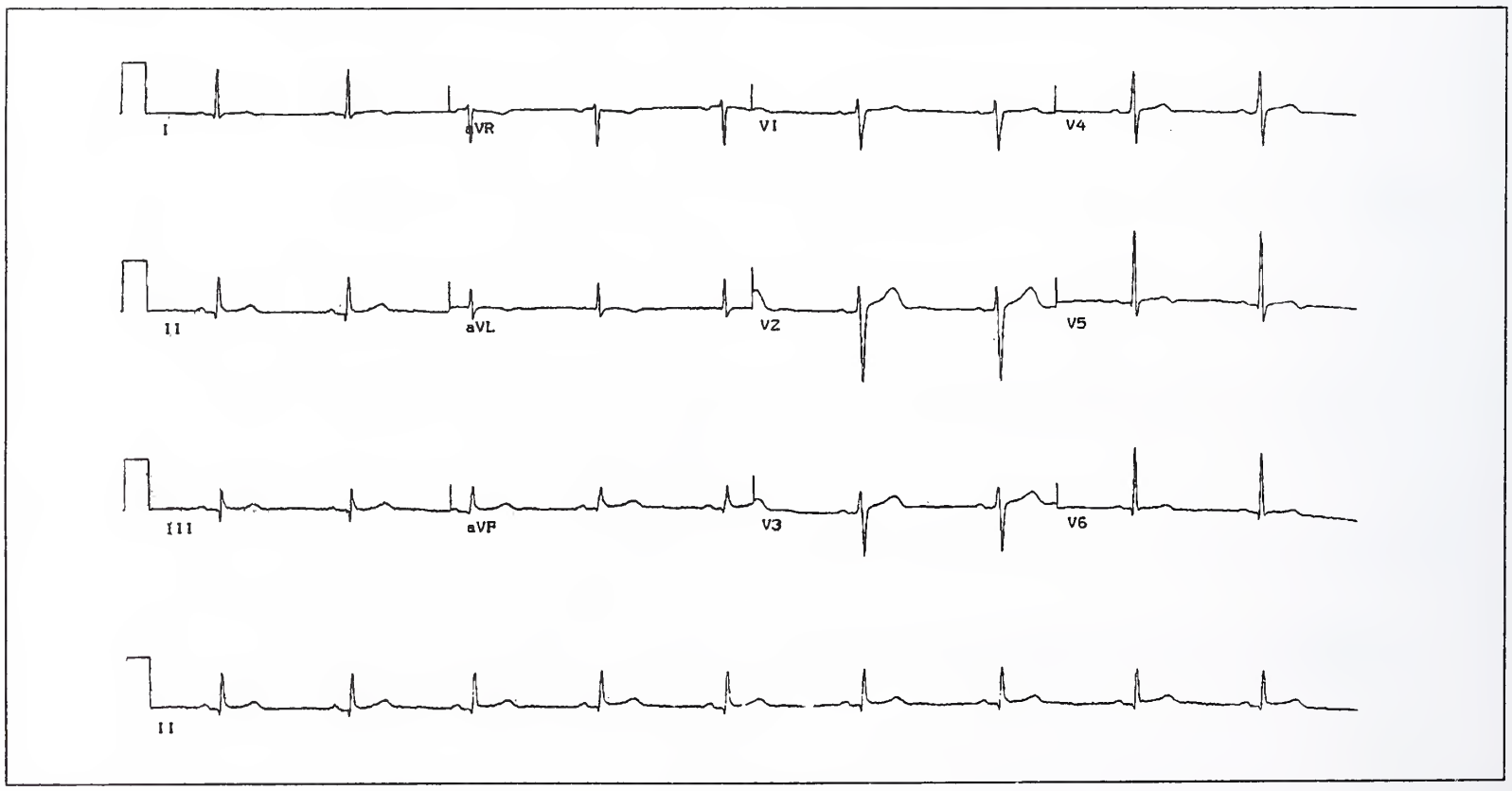

Fig. 2

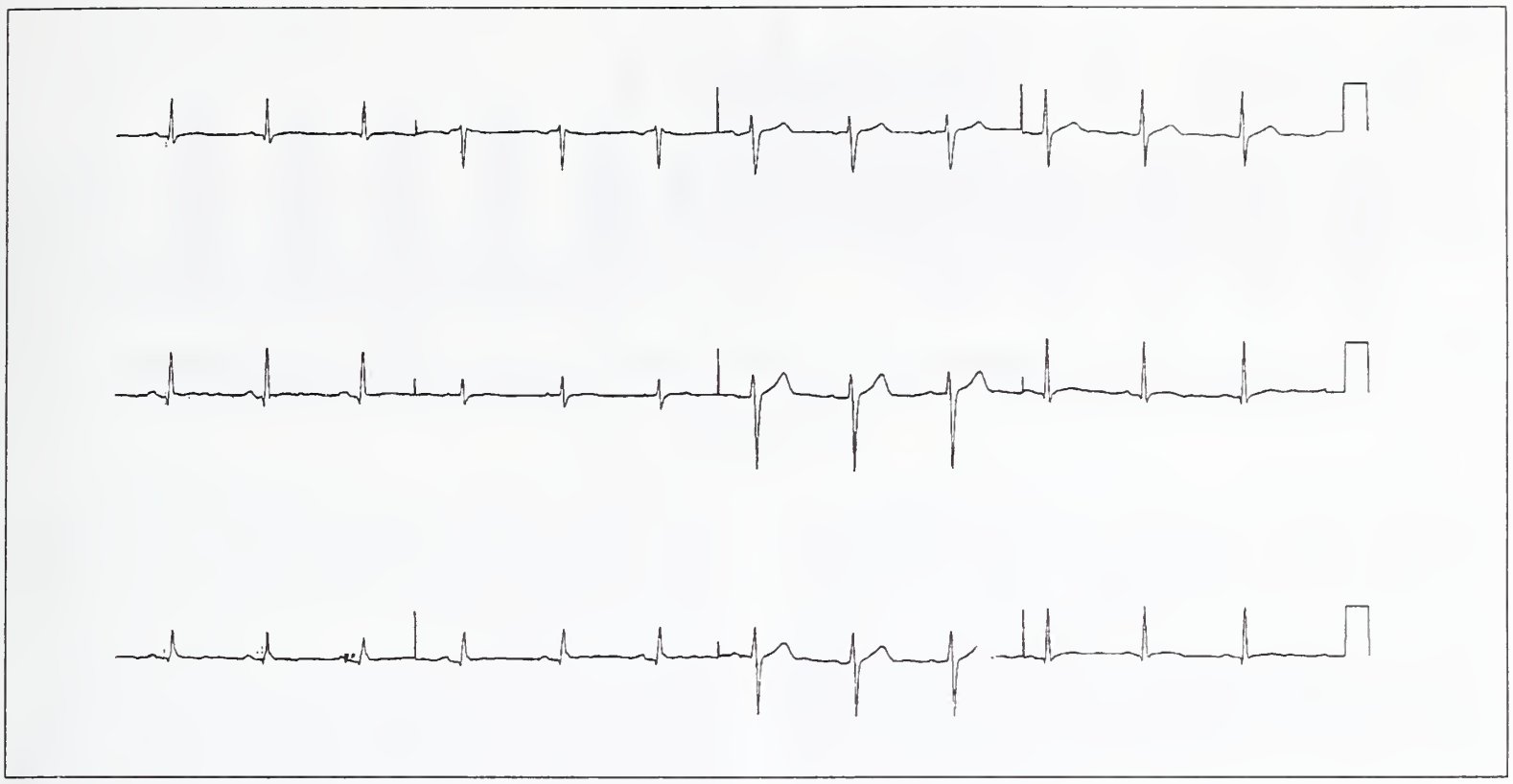

Fig. 3

Complications from *Campylobacter jejuni* infections in immunocompetent hosts are rare. Bacteremia occurs in less than 1% of infected patients. Myopericarditis - an inflammatory process involving both the myocardium and pericardium - is rarely reported.[2,3] The diagnosis is often considered in patients with unexplained heart failure, arrhythmias or chest pain in the setting of a previous or an ongoing, febrile illness. Subclinical disease with a benign course is common. Myopericarditis can masquerade as AMI - as it did in this case. The chest pain of myopericarditis can be distinguished by its sharp, respirophasic, nonexertional qualities. The pain is frequently exacerbated by placing the patient in a supine position. CPKs are elevated during the acute phase of the process. Characteristic EKG evolution of EKG changes was demonstrated by this patient. Initially ST-segment elevation occurs in many leads without reciprocal changes. Later, diffuse ST-T wave flattening or inversion is typical. Viruses and rickettsial organisms are the most commonly identified infectious cause. In this patient, the antibody titers for coxsackie Virus A and B, echovirus, and *Borrelia Burgdorfi* were negative - further implicating *Campylobacter jejuni* . Diagnosis of myopericarditis can be confirmed by Indium antimyosin antibody imaging which detects myocardial necrosis. This scan has a high specificity but a low sensitivity. Endomyocardial biopsy, the gold standard test, may be indicated in patients with suspected myocarditis and congestive heart failure, in whom other etiologies must be considered.

The Management

Quinoline antibiotics are effective antimicrobial therapy. The patient was given ciprofloxacin.

Over one week his diarrhea gradually improved. His chest pains rapidly lessened, and no symptoms of ventricular dysfunction developed. Endomyocardial biopsy was not done. Two years after his infection, the patient is still well.

References

1. Blaser MN. Campylobacter infections. In: *Harrison's Principles of Internal Medicine*. New York: McGraw-Hill;1994:679-81.
2. Florkowski CM, Ikram RB, Crozier IM, et al. Campylobacter jejuni myocarditis. *Clin Cardiol* 1984;7:558-59.
3. Ponka A, Pitkanen T, Pettersson T. Carditis and arthritis associated with campylobacter jejuni infection. *Acta Med Scan* 1980;495-6.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Recent Cerebrovascular Mortality in Rhode Island

John P. Fulton, PhD

Cerebrovascular diseases cause about 150,000 "stroke" deaths per year in the United States, accounting for about 7% of all deaths annually (1993 data).[1] Rhode Island experienced an average of 608 cerebrovascular deaths per year during the period from 1990 through 1994. This number represented about 5% of all deaths in the state (Table 1).

In recent years, age-adjusted stroke mortality has been about 18% lower in Rhode Island than in the U.S. as a whole (Figure 1). In 1994, the latest year for which data are available for the whole nation, age-adjusted stroke mortality was 22% lower in Rhode Island (21 per 100,000 population) than in the U.S. (27 per 100,000). This persistent differential is largely attributable to differences in the racial composition of the Rhode Island and U.S. populations. The proportion of African Americans in the former (4% in 1990) is only one-third the proportion of African Americans in the latter (12% in1990). African Americans have substantially higher stroke mortality (age-adjusted) than any other racial or ethnic group in the United States. In 1993, the latest year for which data are available by race and sex, African American males experienced an age-adjusted stroke mortality of 52 per 100,000, as opposed to 27 per 100,000 among white males in the U.S. The comparison is similar for females, 40 per 100,000 versus 23 per 100,000, respectively.

Although the number of stroke deaths among African Americans in Rhode Island between 1990 and 1994 (77) is too small to calculate a precise mortality rate, a statistical technique called indirect standardization may be used to compare the actual number of stroke deaths among African Americans in the state to the number of stroke deaths which would be expected if African Americans were to experience the same age-specific stroke mortality as the Rhode Island population in general. In the five years 1990-1994, African Americans in Rhode Island experienced 61% more stroke deaths than would have been expected on the basis of the stroke mortality observed among all Rhode Island residents.

Similar to the U.S. experience, stroke mortality in Rhode Island increases dramatically with age (Figure 2) and is moderately higher among males than among females (Figure 3). In 1994, for example, the age-adjusted stroke mortality rate for people ages 65 and over was 11 times higher than the age-adjusted stroke mortality rate for people ages 45-64. In the same year, the gender differential was only 5%, a low for the1990-1994 period.

Stroke mortality in the United States has declined steeply over the past four and a half decades. In 1950, for example, the age-adjusted stroke mortality rate was 89 per 100,000. By 1994, the age-adjusted stroke mortality rate had declined to 27 per 100,000, about one-third of its 1950 magnitude. The rate of decline has slowed substantially in recent years, and may have plateaued in the early 1990's. In Rhode Island, for example, the age-adjusted stroke mortality rates from 1990 through 1994 were 23, 21, 22, 24 and

Table 1. Cerebrovascular Deaths, Rhode Island, 1990-1994, by Race and Ethnicity

Race and Ethnicity	1990	1991	1992	1993	1994	Total
White Non-Hispanic	569	562	596	624	576	2,927
Black Non-Hispanic	16	16	12	21	12	77
Hispanic	1	6	4	5	1	17
Asian	5	1	3	1	2	12
Native American	0	1	0	1	1	3
Other	1	0	0	1	0	2
Total	592	586	615	653	592	3,038

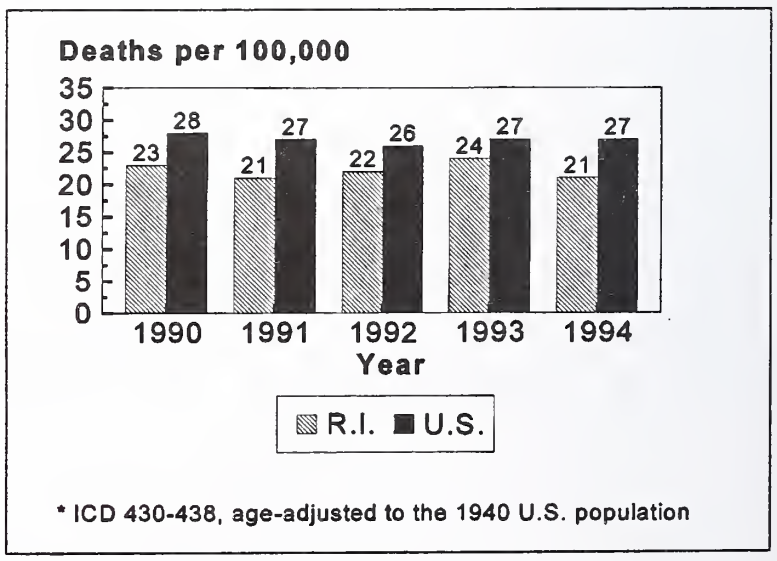

Figure 1. Age-Adjusted Stroke Mortality*, Rhode Island and the United States, 1990-94

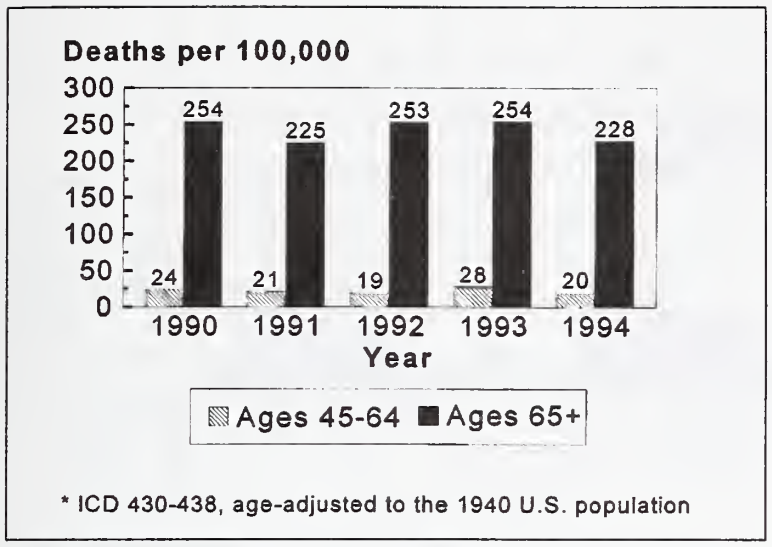

Figure 2. Age-Adjusted Stroke Mortality*, Rhode Island, 1990-94, by Age

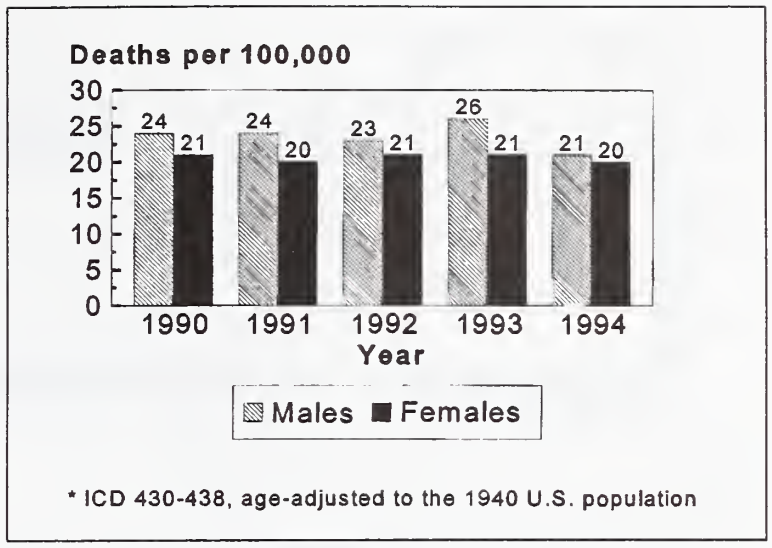

Figure 3. Age-Adjusted Stroke Mortality*, Rhode Island, 1990-94 by Gender

21, respectively.

The dramatic decline in stroke mortality since 1950 has been attributed primarily to the partial control of hypertension and secondarily to a reduction in cigarette smoking. Accordingly, *Healthy Rhode Islanders* 2000 [2] has targeted both risk factors with the following objectives:

- Increase to 75% the proportion of people with high blood pressure whose blood pressure is under control. (1988-1991 National Baseline: An estimated 24% of persons with high blood pressure [a diastolic blood pressure over 90 or a systolic blood pressure over 140 before treatment] had blood pressure under control.)
- Reduce the initiation of smoking by children and youth so that no more than 15% have become regular cigarette smokers by age 20. (1993 Rhode Island Baseline: 19% of high school seniors smoked.)
- Reduce cigarette smoking to a prevalence of no more than 155 among people aged 20 and over. (1994 Rhode Island Baseline: 22%.)

If stroke mortality is to be reduced further, high blood pressure will have to be controlled more aggressively. This is no easy task, as this month's *Public Health Briefing* explains. The role of the primary care provider is key to progress. A new paradigm for the care of hypertensives (involving substantial family involvement) may help, but the achievement of effective, long-term control of high blood pressure will remain complex. Continued reductions in the proportion of people using tobacco will also contribute to further reductions in stroke mortality. Although steady progress has been made on this front, the tobacco industry is resilient, and nicotine addiction tenacious. Public health efforts on the tobacco control front must be unswerving, assisted by primary providers of pediatric and adult health care. Although progress in tobacco cessation, like progress in the control of high blood pressure, has been slow, it has been steady, and will continue if we all stay the course.

References

1. National Center for Health Statistics. *Health, United States, 1995.* Hyattsville, Maryland: Public Health Service, 1996.
2. Rhode Island Department of Health. *Healthy Rhode Islanders 2000: Report of the Governor's Task Force for the Year 2000 Objectives for Rhode Island.* Providence, RI: Rhode Island Department of Health, January, 1994.

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CANCERS UNIQUE TO WOMEN

WHAT'S THE BEST we can do to help clinically (eg. the p-values)

CAN WE DO MORE? than clinic science (eg. the human values)

A practical, realistic, fun, clinical update for Primary Care Providers looking at what's the state of "clinical art" for cancers unique to women (eg. breast, ovary, uterine, cervix) as well as the human element and "other art" essential to the best possible (dare we say) "outcome" for the patient and family.

Please join in this very special day of education, challenging concepts like "cancer isn't cancer", and more (yes, we can do more; and conferences can be more). Let's learn and celebrate together in beautiful (new & old) Providence, about – what's *best* and how we *can* do more.

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PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Hypertension Control: Progress, but ...

Andrea G. Vastis, CHES

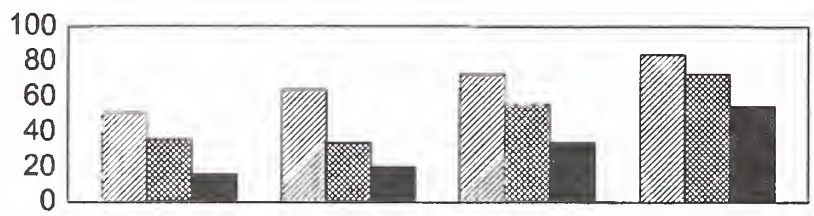
Progress

The United States population experienced steady progress in the control of hypertension from 1971 through 1991, as measured in four rounds of the National Health and Nutritional Examination Survey (NHANES I, 1971-72 and 1974-75; NHANES II, 1976-80; NHANES III,1988-1991). Of persons with hypertension (blood pressure >160/95 mm Hg or currently taking antihypertensive medication), the percentage aware of their condition increased from 51 to 84, the percentage receiving treatment increased from 36 to 73, and the percentage for whom their hypertension is controlled increased from 16 to 55 (Figure 1).[1] Even when persons with mild hypertension are included in the mix (blood pressure >140/90 mm Hg or currently taking antihypertensive medication; data available from NHANES II and NHANES III), steady progress is revealed from 1976 through 1991. The percentage aware of their condition increased from 54 to 65, the percentage receiving treatment increased from 33 to 49, and the percentage for whom their hypertension is controlled increased from 11 to 21 (Figure 2).[1]

But ...

Despite the universal practice of blood pressure screening in this country, *not all persons with hypertension have been made aware of their condition* (16% using the >160/95 mm Hg criterion; 35% using the >140/90 mm Hg criterion), whether because they have not been screened, they have not been informed of the outcome, or they did not understand or forgot the information from providers. *Of those who are aware, some are not receiving treatment* (11% out of 84% using the >160/95 mm Hg criterion, and 16% out of 65% using the >140/90 mm Hg criterion), whether because they have not sought care, they lack effective access to care, or they have refused treatment. Finally, *of those who are treated, some are not controlled* (18% out of 73% using the >160/95 mm Hg criterion, and 28% out of 49% using the >140/90 mm Hg criterion), either because they cannot or do not adhere to prescribed treatment regimens, or their medication regimen is not effective. The numbers are getting better, yet those with mild hypertension continue to elude efforts aimed at hypertension control.

Figure 1. Percentage of persons with hypertension* who are aware of their diagnosis, who get treatment, and whose hypertension is controlled**



Year of NHANES	1971-72	1974-75	1976-80	1988-91
Aware	51	64	73	84
Treated	36	34	56	73
Controlled	18	20	34	55

* >=160/95 mm Hg, one occasion, or taking meds

** <160/95 mm Hg

Source: National Center for Health Statistics

Barriers to Control

Physicians' awareness of the barriers to patient blood pressure control have increased, as revealed in two surveys of physicians run by the National Heart, Lung, and Blood Institute in1977 and 1987. Factors which were categorized as "often an impediment" to effective treatment by at least one-third of the respondents in 1987 included life-style changes (67%), failure to take medications as instructed (42%), lack of understanding of the problem (39%), cost of drug therapy (39%), and drug side effects (34%). A national survey of patients who stopped taking medications for blood pressure control revealed that nearly half stopped because they thought they were cured, 11% because of negative side effects, and 6% because of cost.[2] In low-income inner-city populations, patients are more likely to be uninsured or underinsured, functionally illiterate in English, and less likely to seek health care, thereby exacerbating the barriers to control of hypertension.[3]

Figure 2. Percentage of persons with hypertension* who are aware of their diagnosis, who get treatment, and whose hypertension is controlled**

Year of NHANES	1976-80	1988-91
Aware	54	65
Treated	33	49
Controlled	11	21

* >=140/90 mm Hg, one occasion, or taking meds

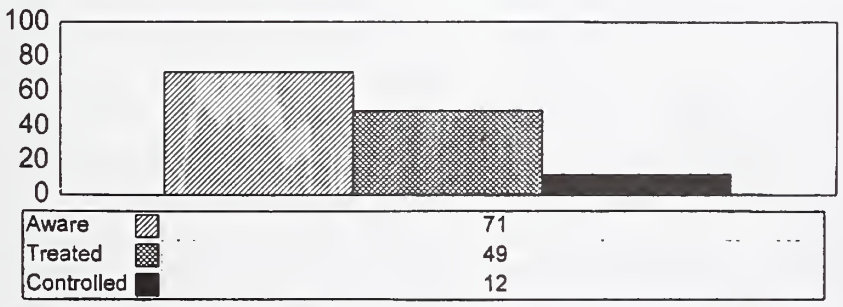
** <140/90 mm Hg

Source: National Center for Health Statistics

Beyond Access

While increasing access to care may have positive effects on the control of hypertension, the barriers to control, described in the literature, go beyond this issue alone. Low rates of hypertension control can be seen not only in medically underserved populations, but also among well-insured populations with excellent access to primary care. A 1992 study of unionized health care workers in New York City revealed a control profile (Figure 3) similar to the control profile of randomly selected respondents interviewed nationwide in NHANES III (1988-1991); of 409 workers with hypertension (using the >140/90 mm Hg criterion), 71% were aware of their condition, only 49% received treatment, and a mere 12% had controlled their hypertension.[4] What makes these findings especially significant is that the workers had "comprehensive health care benefits from the union, including all charges for physician visits, hospital visits, prescription medications, vision care, and dental care," and were apparently making full use of them. Further, control of hypertension was not related to the number of physician visits made. The authors point out, "These results are virtually identical to those reported for Chicago workers more than two decades ago, and they suggest that as rates of awareness and treatment reach their limits, overall control cannot be expected to improve significantly." They conclude, "Increased access, by itself, is not likely to break this pattern of failure. If significant improvement in hypertension control is to be achieved, either the primary care process must be improved or a superior approach must be instituted."[5]

Figure 3. Percentage of persons with hypertension* in an insured population who are aware of their diagnosis, who get treatment, and whose hypertension is controlled**



* >=140/90 mm Hg, one occasion, or taking meds

** <140/90 mm Hg

Source: Stockwell, et al.

A Little Support, Please!

In recent years several individual experts and a number of national organizations have suggested enlisting the patient's family in the therapeutic process to improve adherence to prescribed therapies for hypertension. This technique is not new, of course; it has been used informally by providers in the past, especially with pediatric and geriatric patients who have identifiable caregivers in the home. What *is* new is the formal appreciation that *daily social support* is a necessity for most patients, and that periodic support from primary care providers may be used most effectively to propose, promote, and guide the process.

Effective therapy for hypertension involves nothing less from the patient than comprehensive lifestyle change: increased exercise, sustained weight loss, reduction of sodium and alcohol in the diet, cessation of tobacco use, daily medication when necessary, and awareness of side effects which may interfere with physical and sexual functioning. To succeed, most patients need reminders and reinforcement to stay on track; some require supervision. As well, "most patients appreciate regular praise or other positive reinforcement for their extra efforts, especially when prescribed treatment accompanies major lifestyle changes or other behavioral sacrifices."[6]

In recognition of these needs, the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure suggests to providers: "Promote social support. Educate family members to be a part of the blood pressure control process and provide daily reinforcement. Suggest small group activities to enhance mutual support and motivation."[7] In its *Working Group Report on Hypertension in the Elderly*, The National Heart, Lung, and Blood Institute suggests that "a portion of one or more patient visits spent with the patient's spouse, other close relative, neighbor, or other friend can build support for the treatment regimen. Patients living alone should be encouraged to identify one person who can offer reinforcement of the care regimen (even by telephone), assist with medications (such as refilling the unit dose dispenser), or provide transportation to office visits."[8]

An ongoing intervention in Philadelphia which won the *1995 U.S. Department of Health*

and Human Services Secretary's Award for Innovations in Health Promotion and Disease Prevention "incorporates the use of family and friends; it utilizes the therapeutic relationship or alliance of the physician-patient; and it embraces the well-established fact that social support plays a key role in promoting health, decreasing susceptibility to disease, and facilitating recovery from illness. The physician asks the patient to identify who in their life loves or cares for them and would help them adhere to the treatment protocol. To implement the '90 SI'[90-second intervention], the physician instructs the patient to telephone, in his or her presence, the identified helper(s) who then agree to support the patient's medical regimen."[9]

The role of the primary care provider is the key to effective therapy. What is being suggested, however, is a subtle reorientation of that role, from *primary support* to *secondary support* for therapy by fostering a family-based primary support network for the patient that provides the guidance and positive reinforcement provided mainly by the provider in the past. This approach is being tested and should be well-evaluated in the next few years. With its basis in well-established theory, its similarity to the informal successes of many primary care providers, and its compatibility with the changes brought about by managed care, this family-based primary support network holds much promise in the control of hypertension.

References

1. National Heart, Lung and Blood Institute. *The fifth report of the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure.* NIH Publication No. 93-1088. Bethesda, MD: National Institutes of Health, 1993.
2. Clark LT. Improving com;liance and increasing control of hypertension: needs of special hypertensive populations. *Am Heart J* 1991;121(2.2):664-669.
3. Francis CK. Hypertension, cardiac disease, and compliance in minority patients. *Am J Med* 1991;91(suppl 1A):29S-36S.
4. Stockwell DH, Madhavan S, Cohen H, et al. The determinants of hypertension awareness, treatment, and control in an insured population. *AJPH* 1994;84(11):1768-1774.
5. Schoenberger JA, Stamler J, Shekelle RB, Shekelle S. Current status of hypertension control in an industrial population. *JAMA* 1972;222:559-562.
6. Rudd P. Clinicians and patients with hypertension: unsettled issues about compliance. *Am Heart J* 1995;130:572-579.
7. The Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. The fifth report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. *Arch Intern Med* 1993;153:154-183.
8. The National Heart, Lung, and Blood Institute. *Working Group Report on Hypertension in the Elderly.* NIH Publication No. 94-3527. Bethesda, MD: THe National Heart, Lung, and Blood Institute, 1994.
9. Fishman T. The 90-second intervention: a patient compliance mediated technique to improve and control hypertension. *Public Health Reports* 1995;110(2):173-178.

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Point of View: For the Children of Incarcerated Addict-Mothers, Prescription: School

Kevin Vigilante, MD, MPH, and Timothy Flanigan, MD, MPH

As physicians specializing in the care of women who are HIV+, as well as women at risk of being HIV+, we see patients who are addicted to heroin or cocaine. Many have been incarcerated. They suffer from the litany of social ills that often dwarf the medical ones: poverty, illiteracy, homelessness, sexual abuse, teen pregnancy, unemployment... Some will die prematurely from overdose, trauma, cardiovascular disease, and HIV.

Most of these women have children. And statistics suggest that many of these children will echo their mothers' lives.

We recognized the limitations of the "medical model" in helping these children. Our research and experience convinced us that the best way to prevent this almost incurable sociomedical syndrome in the children of addict/inmate mothers was education, beginning at an early age. Our "prescription" for these children spurred the development in 1996 of R.I.S.E. (Rhode Islanders Sponsoring Education), a 501c-3 organization that will underwrite the tuitions of at-risk children at local private and parochial schools.

Research

Throughout the country and Rhode Island, approximately 75-80% of incarcerated women have children. Currently approximately 1.5 milion children in the United States have at least one incarcerated parent; at least 3.5 million children have parents on probation or parole.[1] Researchers for the Federal Sentencing commission document "an increase in antisocial, delinquency and criminal behavior in children when their caretaking parent is incarcerated."[2] Roughly 30% of such children become delinquent, and 22% join gangs.[1] Other researchers estimate that 50% of these children will have classroom behavior problems and 70% will perform poorly in school.[1] At the Adult Correctional Institute, 95% of women have a history of substance abuse; their children are at significant risk for substance use.

Although the children of women with a history of incarceration and/or addiction are at the core of the intergenerational cycle of poverty, addiction, crime and premature death, few comprehensive integrated educational services target this population - not just in Rhode Island, but in the country.

Education-as-Intervention

Although physicians generally prescribe medical/surgical remedies, the best intervention for these children seems to be quality education, starting at a young age.

While many different kinds of schools, public and private, can be effective, some common characteristics of "effective schools" include: small size, a strong and pervasive sense of mission, autonomy, minimal bureaucracy, a safe environment, an academic curriculum, high expectations, and a commitment to character-building, caring and compassion. [3-5]

The outcomes from one New York City program - Student/Sponsor Partnerships (S/SP) - are promising. S/SP identifies at-risk children headed for inner city New York City high schools, where the graduation rates hover around 20%. Over the last 10 years S/SP has placed over 1000 children in "effective" independent schools: over 70% of participants graduated. Of those graduates, 90% went to college.

R.I.S.E. (Rhode Islanders Sponsoring Education)

R.I.S,E. seeks to replicate the success of S/SP, with a program designed around Rhode Island parents and institutions.

Since we recognize the crucial importance of the mother-child bond, we hope to foster that bond. We will recruit mother-child pairs from the parenting classes at the A.C.I. and the SSTAR-Birth drug treatment facility for addicted mothers. From those mother-child pairs, R.I.S.E. will enroll willing children, giving preference to children who are struggling academically.

The schools that will initially participate are Bishop McVinney, Community Prep, Elizabeth Ann Seton, Bay View Academy, and San Miguel - all small, with a sense of mission, autonomy, minimal bureaucracy - in short, schools that meet the research-based criteria for "effective" schools. In addition, we will be placing children in schools in or near their neighbhorhoods.

Our research and experience convinced us that the best way to prevent this almost incurable sociomedical syndrome in the children of addict/inmate mothers was education, beginning at an early age.

The children's tuition will be paid by individual financial sponsors who may also serve as mentors. R.I.S.E. will supplement, where necessary, the contribution of each sponsor.

We have targeted children entering middle school years. When children graduate from eighth grade, we will seek to place them in high schools consistent with their capabilities - including Classical, Moses Brown, Urban Collaboratove, School One, LaSalle, Bay View, Textron Academy, the Feinstein School, even out-of-state boarding schools like Philips Academy. We will establish formal collaborations with these schools, or schools like them.

Prognosis

We will track academic success: grades, standardized test scores, competitive placements, high school and college graduation.

We will also track truancy, disciplinary actions, drug use, teen pregnancy, arrests, and incarceration.

Our goal is to track every child for 16 years.

We are optimistic - based not solely on past research, but on the people involved in this project. The mothers are thrilled to have assistance in educating their children; the schools are committed to helping these children; and the sponosrs know that when they make a contribution to R.I.S.E., the money directly benefits a child.

References

1. Johnston D. *Children of Incarcerated Parents.* NY: Lexington Book, 1995, p8.
2. Wald P. Why Focus on Women Offenders? Lecture: National Association of Women Judges, 1996.
3. Meier D. *The Power of Their Ideas.* MA: Beacon Press, 1995, p.45.
4. Sizer T. *Horace's Compromise.* MA: Houghton Mifflin, 1984, pp. 225-27.
5. Bryk A, Lee V, Holland P. *Catholic Schools and the Common Good.* Cambridge: Harvard University Press, 1993, pp. 56-57.

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The two co-founded R.I.S.E.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	November 1996	12 Months Ending with November 1996	
	Number	Number	Rates
Live Births	983	13,717	13.9*
Deaths	860	9,622	9.7*
Infant Deaths	(3)	(82)	6.0#
Neonatal deaths	(2)	(62)	4.5#
Marriages	581	7,971	8.1*
Divorces	229	3,294	3.3*
Induced Terminations	471	5,480	399.5#
Spontaneous Fetal Deaths	95	1,000	72.9#
Under 20 weeks gestation	(89)	(943)	68.7#
20+ weeks gestation	(6)	(57)	4.2#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	May 1996	12 Months Ending with May 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	300	3,229	326.2	4,128.4
Malignant Neoplasms	225	2,592	261.9	7,376.5
Cerebrovascular Diseases	46	616	62.2	664.5
Injuries (Accident/Suicide/Homicide)	36	340	34.4	6,320.0**
COPD	30	359	36.3	305.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Judicial Diagnosis

New HCFA Physician Incentive Plan Regulations: A Physician's Guide

Michele B. Lederberg, JD, MPH

HMOs that serve Medicare and Medicaid enrollees operate on risk-contracts, where the HMO bears the "risk" of costs. The government pays a per capita sum to the HMO: if the aggregate costs for patient care exceed the aggregate government payment, the HMO is "at risk," and must absorb the deficit.

Often HMOs contract with physician group practices; often those practices share some of that risk. In such cases, physician groups may receive a pre-determined budgetary sum; those that spend beyond that ceiling must absorb the shortfall. For example, an HMO may contract with a group of orthopedic surgeons. The HMO pays a certain amount per HMO member per month to the practice for all the services that the practice furnishes to HMO members. Payments remain the same - whether the group furnishes few or many services to HMO members. Understandably, if every HMO member requires hip replacement surgery, the practice will suffer financially.

In traditional fee-for-service Medicare and Medicaid, the government is the insurer, retaining a contractual relationship with provider--physicians; and the government scrutinizes provider-physicians. But in "managed care" Medicare/Medicaid, the HMO has stepped into the shoes of the government and acts as the insurer. When Medicare and Medicaid patients enroll in HMOs, the government does not directly regulate the physician-patient relationship. Instead, the government closely regulates these pre-paid health plans and imposes requirements on them concerning their relationships with contracted physicians.

The New "Physician Incentive Plan" (PIP) Regulations

In December 1996, the Health Care Financing Administration (HCFA) published the long-awaited final version of Physician Incentive Plan regulations. Effective January 1, 1997, these PIP Regulations regulate financial arrangements between pre-paid health care plans, like HMOs, with Medicare or Medicaid contracts and a physician or physician group.

The PIP Regulations impose new obligations not only on Medicare/Medicaid HMOs, but also on the physician groups that provide services to these organizations on a risk basis.

The PIP Regulations impose new obligations not only on Medicare/Medicaid HMOs, but also on the physician groups that provide services to these organizations on a risk basis.

The government does not regulate the relationship between the HMOs and all their contracting physicians or physician groups - only those that bear "substantial risk."

Determination of "Substantial Risk"

"Referral services" are at the core of the definition of financial risk. Typically a group of primary care physicians will contract with an HMO to provide a menu of services for HMO members. Some services, the group will provide directly (generally, the usual primary care services). But for other services, the group will refer patients to other physicians/hospitals/testing facilities. A primary care group may refer some patients with diabetes to an endocrinologist. Depending upon the HMO's contract with the physician group, the group's compensation may depend in part upon the costs of those referrals.

According to the PIP Regulations, a group is at "substantial financial risk" when more than 25% of its potential payment from a Medicare HMO for services provided to Medicare/Medicaid patients is tied to referral services. For example, if a primary care group contracts with a Medicare HMO and is eligible to receive a bonus equal to 33% of the physician group's total payment from the HMO if the group's level of referrals for its member-patients does not increase over the previous year's level, that group would be at "substantial financial risk" under the PIP Regulations. The 25% threshold

is not arbitrary. The government selected it after much thought and comments concerning the "critical level" for compensation: that is, the level at which compensation becomes an incentive to withhold referrals.

The Regulations set forth six circumstances where more than 25% of a physician group's potential payment from a Medicare HMO may be tied to "referral services" that the group does not provide, and the group would be "at substantial financial risk."

HCFA, however, excludes large-panel (serving 25,000 + patients) groups. HCFA does not consider them to be at substantial financial risk, even if more than 25% of their potential Medicare/Medicaid HMO payment comes from referral. The reason: HCFA believes that those large-panel groups can adequately spread the risk of loss.

Requirement: Stop-Loss Insurance

For physician groups "at substantial financial risk" for services provided to HMO Medicare/Medicaid patients, the PIP Regulations specify the level of stop-loss protection that the group must carry. In earlier versions of the PIP Regulations, HCFA held the Medicare HMO responsible for the purchase of stop-loss protection. Currently, Medicare HMOs need only provide HCFA with assurances that the contracted groups have the required protection. Thus, Medicare HMOs may now hold physician groups liable for ensuring that they have obtained adequate stop-loss protection.

In regulating stop-loss protection, HCFA is acting not so much out of concern for physicians' solvency, but for patients' welfare. In a hypothetical nightmare, a group practice that contracts with a Medicare HMO, fearing insolvency, restricts referrals more than would otherwise be warranted. Or a practice is left insolvent, leaving patients without their accustomed physicians.

Requirement: Disclosure of Financial Information

In addition, PIP Regulations require physician groups to disclose certain sensitive financial information to the Medicare HMOs with which they contract. Although HCFA does not have statutory authority to directly regulate physician groups participating with Medicare HMOs, most agreements between physician groups and Medicare HMOs require the group to cooperate with the HMO in complying with federal regulations.

Specifically, the PIP Regulations require that Medicare HMOs disclose the following information to HCFA concerning physician group payment mechanisms that put physician groups at substantial financial risk:

* (i) the type of incentive arrangement in place (e.g. a withhold, bonus or capitation);
* (ii) if the incentive plan involves a withhold or bonus, the percent of any withhold or bonus;
* (iii) the amount and type of stop-loss protection provided.

Not only must a Medicare HMO disclose this information to HCFA for the physician group with which it directly contracts, the HMO must also disclose this information for the arrangement between the physician group and its individual member physicians. In short, if an ophthalmology group practice contracts with a Medicare HMO (at "substantial financial risk," and with fewer than 25,000 patients), the HMO must disclose to HCFA the specific financial arrangments between the HMO and the group practice - as well as between the group practice and its member-ophthalmologists.

Once a Medicare HMO furnishes this information to HCFA, the information may fall under the federal Freedom of Information Act. If so, the public has access to it. Although the Freedom of Information Act permits a federal agency to refuse to disclose privileged and confidential information, it remains to be seen whether HCFA will deem this information privileged and confidential. If not, the Medicare HMO must disclose it.

The PIP Regulations are confusing and complex. - and it is unclear how strictly HCFA will enforce them. Although Medicare HMOs have the primary burden of compliance, the PIP Regulations impose substantial obligations on physician groups as well.

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Ninety Years Ago

[April, 1907]

Edmund D. Chesebro, MD, retiring president of the Providence Medical Association, provides the text of his annual address before its membership. After a brief review of the local events within the local society during the past year, he reflects upon the accomplishments of the American Medical Association during this interval including their assertive advocacy of such necessary reform measures as the Federal Food and Drug Act and the Meat Inspection Bill. He concludes with a plea that the practicing physician use his financial resources prudently and wisely. "In determining what particular securities to select, one's banker, who presumably is a careful, conservative man who has received special training and has had broad experience in financial matters and is therefore able to distinguish between gambling speculation and true investment."

J.L.Morse, MD, a pediatrician from Boston, discusses diseases of the nasopharynx in infancy. After a brief summary of certain unique anatomic features in the newborn, he dwells upon the commonly encountered illnesses of this interval of life. The presenting signs and symptoms of acute rhinitis are discussed and the rational therapies outlined. The complicating infections of the middle ear are stressed. Good nutrition must be maintained and may at times re-

quire stimulants such as strychnia and brandy. Diphtheritic rhinitis is so common when infants are hospitalized, states the author, that at his institution all admissions are routinely given 500 units of antitoxin. Diphtheria in infancy, he stresses, is difficult to recognize and many of the constitutional symptoms are frequently lacking. The problems of adenoidal disease are reviewed and certain therapeutic regimes suggested. Pharyngitis, retropharyngeal abscess and otitis media are carefully discussed with illustrative cases. The author urges that otitis media be aggressively treated with warm water irrigation, external heat, and paracentesis. Internal treatment includes the use of bromides.

Announcement

Archives of the Alcoholics Anonymous Movement

May 16, 1997, Brown University's Rockefeller and Hay Libraries will unveil an exhibit drawn from the Chester H. Kirk Collection on Alcoholism and Alcoholics Anonymous. With a gift from Chester H. Kirk, Brown's Center for Alcohol and Addiction Studies in 1995 bought 15,000 pamphlets, booklets, newspapers, sheet music, videotapes, tapes, and catalogues from a West Virginia collector. The archives span 60 years, including a 1903 Scientific Temperance Federation flyer (warning of fetal alcohol syndrome in dogs), an autographed copy of Charles Jackson's *The Lost Weekend*, and 1920's issues of the Anti-Saloon League newspaper. The display will continue for a month.

Fifty Years Ago

[May, 1947]

The lead article, authored by L.C.Scheffey, MD, discusses the role of the general practitioner in the diagnosis of pelvic cancer. After a short comment on the many pitfalls delaying the diagnosis of pelvic cancer in the woman, the author discusses the dangers of endocrine therapy if unaccompanied by adequate, and repeated, pelvic examination. The typical presentation of various forms of pelvic malignancy, particularly uterine and cervical, are summarized. The author places great stress upon the Papanicolaou test which, in his judgment, "is going to be one of our best measures to detect possible cancer." He concludes: "I think that we have an excellent opportunity to do a great deal of prophylactic work in the early detection and prompt treatment of cancer. I would not be willing to advise and plan radiation or surgical treatment except by confirmation through biopsy and/or curettage."

R.R. Baldridge, MD, discusses the medical and surgical treatment of small bowel obstruction.

The lymphatic spread of carcinoma and its management is considered by G.W.Taylor, MD. "Lymph node metastasis as a result of lymphatic embolus, is a common characteristic of many types of malignant neoplasm. Its occurrence is related to the nature and grade of malignancy of the primary neoplasm, the location in relation to muscles and lymphatics, and the size and duration of the primary carcinomas."

A.E. Hardy, MD, and P.J. Spelman, MD, present an unusual case of a 52 year old woman admitted because of right upper quadrant abdominal pain and fever but no history of trauma to the abdomen. Laparotomy revealed an ulcerative, gangrenous cholecystitis, with perforation, hepatic laceration and hemoperitoneum. The patient recovered.

Twenty Five Years Ago

[May, 1972]

The lead article, by Francis B. Sargent, MD, describes his visit to Scotland to see how the National Health Service functions in a typical primary care setting. He chose the Sighthill Clinic, in a suburb of Edinburgh, because his niece and nephew both practiced as primary care physicians in this facility. The practitioner, on average, works about 80 hours per week, makes from 4 to 25 house calls per day and is paid about $7.50 per patient per year [with an average of about 2,000 patients registered per physician.]

Primary medical care in Sweden is outlined by Joseph L. Andrews, Jr, MD. This nationalized health care system, with about 10,000 physicians,, serves a population of eight million and provides in excess of twenty million ambulatory visits. The author describes a government-run system which tolerates private practice. Care is available for all persons [financed by compulsory health insurance] but problems do exist particularly in coordinating the primary care component with the hospital-based elements of the medical system.

Laurence A. Senseman, MD, describes his experiences as a visiting psychiatrist for two years to the Christian Medical College in Vellore, India. He concludes: "Each day in South India is a new experience and a new adventure - very rewarding if one is interested in attempting to understand his surroundings. It would be quite depressing if we let these sights and smells, which are so overwhelming, get us down. I could not help wondering as I saw all these things happening before my eyes what a real impact the Christian hospital has in a predominantly and overwhelmingly Hindu population."

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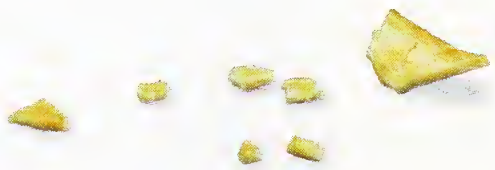

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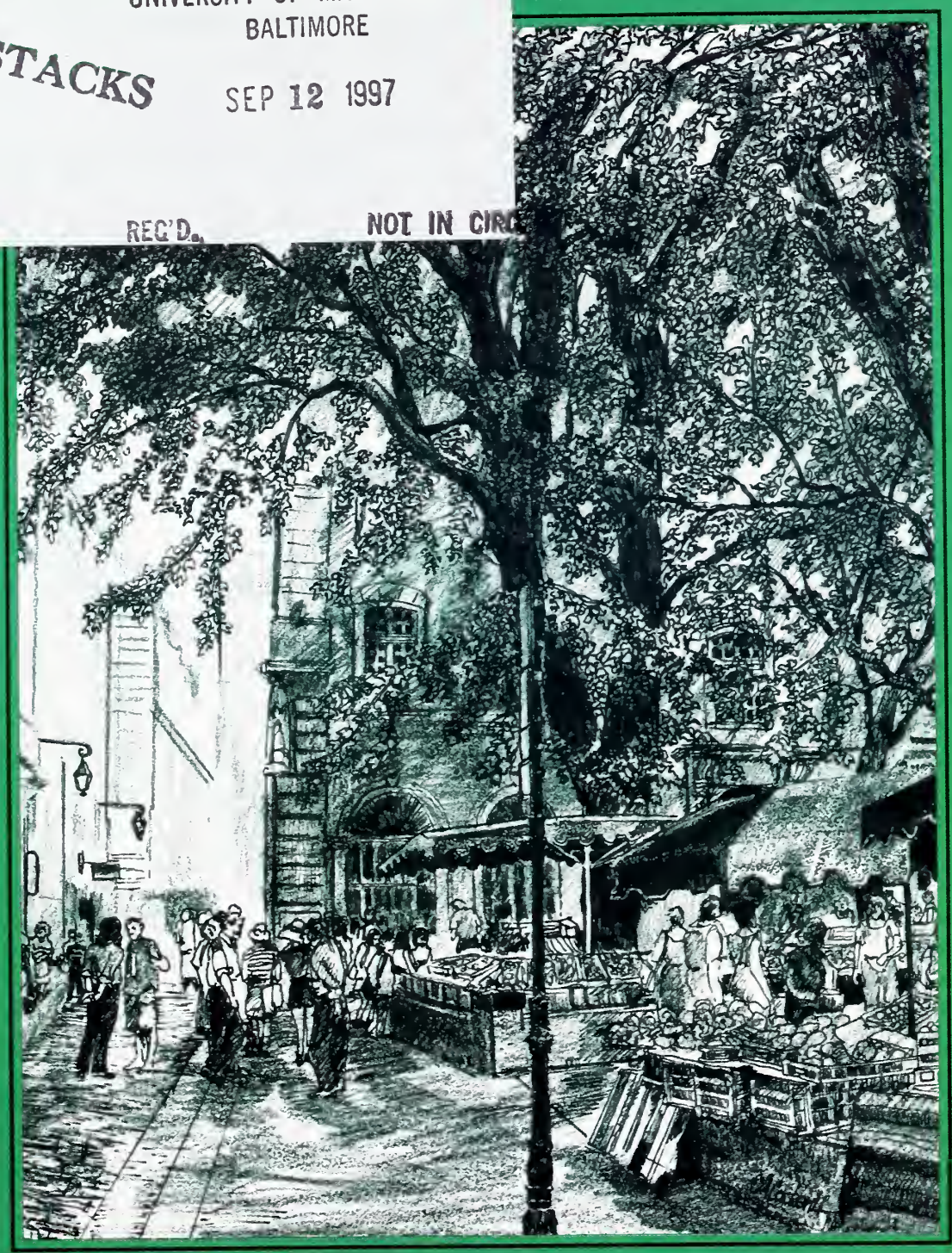

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COMMENTARIES

Grave Violations

Few activities symbolize medical education more vividly than the systematic, personal dissection of the human body. Think of a newly minted medical student and the image of a struggling freshman exploring the interior of a human cadaver comes immediately to mind. Some medical subjects are elective and some disciplines are only tangentially explored by medical students; but anatomy is universal, central and indispensible, standing astride the medical curriculum like a guardian demanding appeasement before the remainder of the required medical courses may even be confronted.

The *obligatory* dissection of a cadaver - as a rite of medical school passage - is in truth only a recent requirement, certainly less than two centuries old. Through the Renaissance, anatomical studies in western Europe were largely passive, didactic affairs with the words of Galen absorbed as though they were received scripture.

Human dissection, expressly for anatomic inquiry, was forbidden in most ancient cultures and knowledge concerning the human interior, typically fragmentary, was derived solely from the embalmers. The first organized effort to gather and disseminate information on human anatomy arose in the medical academy of Alexandria particularly during the tenure of Herophilus and Erasistratus. But after the sacking of Alexandria, the study of human anatomy again stagnated until the 13th century when the Italian medical school of Salernium, under the benevolent protection of Emperor Frederick II, offered a systematic course in anatomy of the pig, with cautious comparisons to the infallible texts of Galen.

Mondino dei Luzzi, a professor at Bologna, performed a dissection of a human cadaver before a small audience of medical students in 1315. He continued his systematic dissections for his students, under royal protection, while gathering his observations into the first text of human anatomy of the modern era, *Anathomia*. Not till two centuries later with the meticulous studies of Vesalius and Sylvius did human anatomy achieve some semblance of a science, although the mythic image of Vesalius stealthily cutting down bodies suspended from the gallows did little to insure anatomy's dignity as a respected life science. Cadavers which had been refused proper interment - either executed criminals or those who had committed suicide - were the principal sources for anatomy laboratories. Western Europe gradually recognized that physicians in training required an abundant source of cadavers and laws were then enacted allowing the practice of "anatomizing" by chartered institutions. In addition to executed criminals, medical schools were given access to unclaimed bodies in almshouses.

Only in Great Britain and its colonies was there a continued reluctance to create legal mechanisms to answer the anatomy needs of medical education. In 1726, George II decreed that the bodies of all executed criminals shall revert to medical schools for purposes of dissection but this was grossly inadequate since there were almost 2,000 medical students and fewer than 100 public executions per year. To answer the inflexible needs of anatomic instruction, a new cottage industry of grave robbing emerged. It required the bribing of cemetery custodians and the indifference of medical schools to the illicit sources of their cadavers. In response to the widespread desecration of graves, many English families surrounded their gravesites with welded iron-bars called mortsafes.

Admittedly, grave-robbing was not an English invention. Graves had been violated for millenia to retrieve precious objects such as funerary jewelry. And in the middle ages, the need to provide religious shrines with relics from the bodies of saints generated yet another grave-robbing entrepreneurship. But the exhuming of bodies solely to provide cadavers for medical education had not been observed until 18th century Great Britain. In some instances the grave robbers [called resurrectionists] were teachers of anatomy or their students. In Glasgow, for example, wealthier medical students could purchase their cadavers from dealers who clandestinely smuggled bodies from Irish graveyards. The poorer medical students, on the other hand, frequented the local cemetery in search of recently interred bodies. And on more than one occasion their actions stirred the populace to riot. In 1831, angry citizens converged on the home of the professor of anatomy who fled for his life, escaping to Baltimore. Mary Shelley's gothic novel, Franken-

stein, was written in 1818 when body snatching - a grave violation - was at its height.

Selling a body to a student of anatomy was a lucrative transaction, netting the grave-robber anywhere from 4 to 10 pounds, an immense sum for but a few late-night hours of labor. Grave robbing yielded an additional source of income. The teeth of the deceased were routinely extracted and sold to dentists who embedded them in dentures as false teeth.

In 1827, two Edinburgh men, William Burke and William Hare, began their ignoble careers as body-snatchers for the local medical school. The demand for cadavers continued to be great and it occurred to them that they might increase the supply of bodies by murder [giving rise to the verb, "burking."] Within a year they were discovered and quickly brought to trial [with Hare turning state's witness]. Burke was hanged on January 29, 1828, and his body publicly dissected in accordance with the court decree. Hare was eventually set free but discovered later by a mob who blinded him with lime. He died years later, a beggar in London.

The callous vandalism of graves and the murders in response to the unceasing need for medical school cadavers finally resulted in remedial legislation. Henry Warburton, cofounder of London University, and Member of Parliament, proposed an enlightened anatomy act which was adopted in August, 1832.

The Act empowered the English Secretary of State to grant licenses to practice anatomy, to widen the sources of cadavers to include all unclaimed bodies, and to create such measures that will protect the anonymity, dignity and ultimate repose of those submitted to "anatomization." The Act also broke the distasteful alliance between the teacher of anatomy and surgery, the gallows and the grave robber.

The American colonies witnessed a similar pattern. The earliest cadavers for anatomic study were executed criminals, those killed in duels and suicide victims. The first medical school in the colonies, the University of Pennsylvania, was periodically rocked by public outbursts against the dissection of cadavers. In April 1788, the citizens of New York rioted because of "very frequent and wanton trespasses in the burial grounds of this City." The anatomy building of the Columbia medical school was attacked and ransacked. To protect the lives of the students the constabulary placed them in protective custody. The militia finally quelled the disturbance but not before six rioters had been killed.

In 1823 Dr. Usher Parsons was chosen to be professor of anatomy and surgery at Brown University. In later years his son wrote: "He made arrangements through channels over which a veil of secrecy had to be thrown, for a supply of anatomical material." The veil of secrecy, however, was not complete and the citizens of Providence were periodically incensed by rumors of grave robbing. On one occasion, some frolicking medical students allowed a barrel containing human bones to roll down College Hill whereupon enraged citizens demonstrated against the University. The Corporation of the University, in a resolution passed in March, 1827, declared that the medical faculty must be fulltime guardians of student behavior thus denying them the privilege of private practice. Local hostility to the medical school anatomy practices may have hastened this resolution. The medical school ceased to operate the following year, not to resume until the autumn of 1972.

Massachusetts, in 1831, was the first state to pass an act legalizing the study of anatomy while simultaneously creating a mechanism for obtaining cadavers.

Many people now will their bodies to anatomy laboratories. But between the grave-robbings of the early 19th century and the current enlightenment, lay over a century of post mortem discrimination in the United States where anatomy room cadavers were almost exclusively Blacks or the former inmates of urban almshouses. It was commonplace for paupers to plead that they not be interred in the almhouse graveyard because they knew - and could daily observe - that bodies destined for the pauper's cemetery were detoured to the local medical school. Indeed, a 1913 survey revealed that the great majority of U.S. medical schools depended upon poor houses and the disenfranchised as their sole source of cadavers.

The fear of grave robbing was pervasive throughout the English-speaking world. These words were inscribed on Shakespeare's tomb:

Blest be the man that spares
these stones,
And curst be he that moves my
bones.

– Stanley M. Aronson, MD

The Naming of Antibiotics

The twentieth century has seen an awesome sequence of great advances in medicine, but none of these has equaled the collective public health impact of the antibiotic agents.

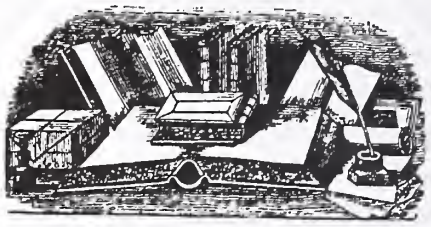
Accompanying the struggle to identify and purify bacteria-destroying substances, came the parallel chore of determining their molecular structures and then giving them names. When establishing a nomenclature for the first generation of antibiotics, their discoverers had resorted to a narrow range of Latin and Greek roots, occasionally incorporating a few family and geographic names.

Fleming's serendipitous encounter in 1929 with a *Penicillium* contaminant upon a plate seeded with *Staphylococcus aureus* led, within 14 years, to the development of penicillin - but only after a sequence of critical discoveries by Florey, Chain and an army of scientists in England and the United States had led to appropriate mass production technics. *Penicillium,* the ubiquitous airborne mold, was named after the Latin, *penicillus,* meaning paintbrush, because of the brushlike sporangia of the organism when viewed microscopically.

In 1930, Rene Dubos had isolated a unique bacterium from the soil of a New Jersey cranberry bog. And because of its very short length, he named it *Bacillus brevis.* From its culture medium, in 1939, he extracted a crude substance capable of lysing Staphylococci *in vitro.* He called it tyrothricin [from the Greek *tyros,* meaning cheese; and *thrix,* meaning hair. In the previous century this family of organisms, hairlike under the microscope, had been observed by Duclaux at the Pasteur Institute where he was studying the role of bacteria in cheese manufacture.] The crude tyrothricin extract yielded two antibiotics: tyrocidin [*-cide* from the Latin, *caedere,* meaning to slay] and gramicidin. Tyrocidin proved to be too toxic for human use, but gramicidin was shown to be of limited clinical value, particularly in topical applications. The drug was named after the Danish bacteriologist, Hans Christian Gram, the discoverer of the staining procedure which distinguished two biologically important families of micro-organisms, those which are Gram-positive and those Gram-negative.

Selman Waksman, Dubos' teacher and mentor, had been engaged in the study of soil microbiology since 1915. For decades he had undertaken systematic microbiological studies of peat bogs, composts and farming terrain to seek answers to a perplexing question: Why, with but a few notable exceptions, did not the soil sustain the growth of disease-producing microbes? Certainly, with the burial of those dying of infectious disease, there was a plentiful source of lethal bacteria seeded into the soil. Waksman presumed, therefore, that certain soil-based microbial agents in some manner neutralized these disease-producing agents. In his laboratories at Rutgers University he devoted a lifetime in isolating those agents with demonstrated antagonism to pathogens. His earlier inquiries, with soil samples from around the world, concentrated on a family of molds called the *Actinomyces* [Greek *actinos,* meaning ray-like; and *mycos,* meaning fungal.] On the basis of various morphological criteria, he then proposed that the name be changed to *Streptomyces* [Greek, *streptos,* meaning pliable or twisted.] And from the medium supporting the growth of *Streptomyces griseus* [Latin, meaning grey] he isolated a cluster of potent antibiotics in 1944, preeminent of which was streptomycin, the first pharmaceutical agent to inhibit the growth of the tubercle bacillus *in vivo.* In the next decade, Waksman's laboratory generated still more soil-generated antibacterial agents including neomycin [Latin *neo-*, meaning new], rhodomycin [Greek *rhodos,* meaning red], and amphotericin [Greek *amphotero-,* meaning capable of acting in two directions].

Polymixin was yet another antibiotic derived from a soil organism, *Bacillus polymyxa,* [*myxo-,* Greek, meaning slime] but with limited clinical application. Still another early polypeptide-antibiotic which proved to be too toxic for parenteral use was bacitracin. It was derived from cultures



of *Bacillus subtilis* ; its name also incorporates the name of the patient, Margaret Tracy, from whom the organism was first isolated.

Aureomycin was isolated in 1947 by B.M.Duggar from the golden-yellow mold *Streptomyces aureofaciens* [Latin, *aurum,* meaning gold; and *faciens [facere],* meaning to do or make.]

Terramycin, developed in the Pfizer Laboratories, was named for *terra-* [Latin, meaning earth] as an indirect homage to Waksman's contention that the earth would provide a treasure trove of antibacterial agents. Because there were clinical and biochemical similarities between aureomycin and terramycin, it was then proposed that they be collectively known as the tetracyclines since structurally they shared four [Latin, *tetra*] rings [Greek, *cyclos*].

Keflin is a tradename for an antibiotic extracted from the mold, *Cephalosporium acremonium*, derived from a sewage outflow in Sardinia. The initial letter in the Greek, *kephalos,* meaning head, is pronounced as a letter 'k' rather than 'c.' The name, keflin, merely exploits the older pronounciation.

Lincomycin, derived from *Streptomyces lincolnensis,* preserves the memory of the sixteenth president. Nystatin was named after its geographic site of discovery [New York State.]

The word *antibiosis* had been initially suggested in 1889 by a French bacteriologist named Vuillemin to describe the innate antagonisms between certain families of microbes. Waksman, fully aware that the word had an awkward meaning [against life], changed it to an adjective, *antibiotic,* to describe the collective family of chemical agents capable of action against microorganisms, *in vivo.*

– Stanley M. Aronson, MD

The Diagnosis and Treatment of Post-Stroke Depression

Colin Harrington, MD, and Stephen Salloway, MD, MS

Stroke is the third leading cause of morbidity and mortality in the United States, with an estimated annual incidence of 300,000 to 400,000.[1] Common behavioral and cognitive sequelae of stroke include depression, psychosis, anxiety, personality change, aphasia, and dysprosody among others.[1] Early investigators observed that depression occurred frequently after stroke.[1,2] For many years post-stroke depression (PSD) was an expected psychological reaction of the individual to the stress of serious illness and loss of physical and cognitive functions.[1,2] However, PSD appears to be more than a reaction to loss of function. Folstein et al. found a significantly increased rate of depression in stroke patients compared to orthopedic patients despite similar levels of disability, suggesting that mood dysregulation is a more specific complication of stroke rather than a general response to disability.[2] Robinson et al. and others failed to demonstrate a consistent relationship between the degree of functional impairment following stroke and the development of PSD.[2,3]

Depression is a major cause of morbidity in stroke patients.[2] Patients with PSD have lower functional status, increased cognitive impairment, and higher mortality rates than stroke patients without depression. Parikh et al. followed 63 patients (25 assessed as depressed, 38 as nondepressed) for two years. The groups were comparable in neurological impairment and activities of daily living scores in the acute stroke period, but the depressed patients were significantly more impaired in physical and language functioning two years after stroke.[3] Morris et al., following 103 consecutive stroke patients with and without depression for 10 years, found a threefold greater mortality rate in the depressed group - independent of age, sex, type of stroke, lesion location and size.[4] The mortality rate was highest for depressed patients who were socially isolated.

Prevalence and Course of PSD

Estimates of the prevalence of PSD range from 30% to 50%.[2] Robinson found a 27% rate of major depression, a 20% rate of minor depression in the first three months after stroke.[2] Using conservative criteria, House found that 11% had major depression at one month and 5% at one year post-stroke. House estimates that rates of major depression at 12-18 months post-stroke are double that of the general population.[5]

The majority of patients with post-stroke major depression are improved at two years. Minor depressive symptoms, however, often persist beyond two years. Approximately one third of patients who are not depressed in the immediate post-stroke period become depressed between three months and two years following stroke.[2] The delayed onset of PSD may be due to patients' realization that their disability is chronic, or to functional reorganization of neurotransmitter systems regulating mood caused by injury. The literature suggests physiologic reorganization in the brain as the primary cause of delayed-onset PSD.

Abbreviations Used:

ADL	Activities of Daily Living
CVA	Cerebrovascular accident
DSM	Diagnostic and Statistical Manual
ECT	Electroconvulsive therapy
MAOI	Monoamine oxidase inhibitor
MMSE	Mini-mental status examination
MRI	Magnetic resonance imaging
PSD	Post-stroke depression
SRI	Serotonin reuptake inhibitor
TCA	Tricyclic antidepressant

The Diagnostic and Statistical Manual IV (DSM-IV) distinguishes between Major Depressive Disorder (idiopathic depression) and Mood Disorder due to a General Medical Condition. The latter does not utilize the detailed diagnostic criteria required for the diagnosis of Major Depressive Disorder. House cites this lack of standardized criteria to diagnose PSD, the site and timing at which patients are sampled (during acute hospitalization, in the rehabilitation unit, in nursing homes, or at home in the community), and the differences in the time lapsed between stroke and diagnosis of depression to explain various studies' differing prevalence rates.[5]

Lesion Location and PSD

Injury to specific brain areas appears to increase the risk of developing PSD, with hemispheric and anterior-posterior asymmetries affecting mood states. Evidence suggests that bilateral lesions in the anterior frontal and temporal lobes and caudate nuclei are associated with an increased risk of depression.[6] The rate of depression is also increased in older people with diffuse subcortical microvascular disease. These patchy subcortical microvascular lesions tend to be greatest in the deep frontal lobe white matter. Researchers have posited that lesions in the left hemisphere, particularly the left anterior frontal lobe and left caudate nucleus, are more likely to be associated with PSD.[2,7] Not all studies, however, have replicated the link of depression and left hemisphere lesions.[1,2,5,8] House traces the variability in findings and possible over-reporting of left hemispheric lesion location and depression to sampling bias and the use of modified and unvalidated diagnostic criteria for PSD.[8]

Gianotti reported an increased frequency of catastrophic reactions in patients with left hemisphere lesions and an increased frequency of indiffer-

ence reactions in patients with right hemisphere lesions.[1,2] Robinson et al. reported that the frequency of PSD was significantly greater in patients with left anterior lesions, and the severity of depression directly related to the proximity of the lesion to the frontal pole. In contrast, the severity of depressive symptoms in patients with right hemisphere stroke was greater in those with posterior lesions.[7] Starkstein et al. reported that patients with subcortical lesions in the left basal ganglia had an increased rate of PSD, similar to that seen in patients with cortical strokes in the left anterior frontal lobe, and that manic symptoms following stroke, though rare, were more likely after right hemisphere injury.[2]

Other risk factors contribute to the likelihood of developing PSD. Subjects with a personal and family history of psychiatric illness are at increased risk, especially after right-sided stroke.[2] A history of prior left-sided stroke in patients with new right hemisphere CVA also increases the risk of PSD.[2]

The frontal lobes and subcortical nuclei are richly innervated by the monoaminergic amines serotonin and norepinephrine. Noradrenergic and serotonergic cell bodies originating in the brain stem send axonal projections through the median forebrain bundle to the frontal lobe where they curve posteriorly and extend their terminal branches to more superficial cortex.[2] Theoretically, anterior and subcortical lesions could interrupt these ascending fibers to a greater extent than posterior and more distally placed lesions, thus resulting in a greater likelihood of PSD. Other studies suggest lateralized biochemical changes in response to infarction.[2] Mayberg et al. found that serotonin binding was higher in the right anterior hemisphere after right hemisphere injury than in the left anterior hemisphere after left hemisphere injury.[9] Robinson and Starkstein have speculated that this relative inability of the left anterior hemisphere to upregulate serotonin receptors after stroke is one reason why injury to this region is more likely to produce depression.[2]

Clinical Presentation of PSD

Except for minor differences, the clinical presentations of PSD and idiopathic depressive illness are similar.[2] Physical and mental slowness are more frequent in PSD; loss of interest and concentration, more common in idiopathic depression.[2] Some researchers have suggested that patients with PSD exhibit more anxiety, worry, and tearfulness, but less guilt, worthlessness, and suicidal thoughts.

Subjects with a personal and family history of psychiatric illness are at increased risk of developing post-stroke depression, especially after right-sided stroke. A history of prior left-sided stroke in patients with new right hemisphere cerevrovascular accident also increases the risk.

The cognitive impairment in patients with PSD appears similar to the syndrome of pseudodementia seen in patients with idiopathic depression.[2] Decreased attention and concentration, and psychomotor slowing are common symptoms of depression, but are also commonly seen in stroke without depression. Aphasia may further complicate the assessment of cognitive functions. Determination of the role played by depression in the cognitive impairment after stroke can be extremely difficult, especially in patients with frontal and subcortical infarctions.

Despite these limitations, Starkstein et al. studied 13 pairs of stroke patients with and without major depression who were matched for lesion location and size and found significantly greater cognitive impairment as measured by lower scores on the mini-mental status examination (MMSE) in the depressed group.[2] Hemispheric lateralization may play a role in the cognitive impairment in patients with PSD. Bolla-Wilson et al. found that patients with depression and left hemisphere lesions had significantly greater cognitive impairment than nondepressed patients with left hemisphere lesions matched for size and location. In patients with right hemisphere lesions, cognitive function did not differ between the depressed and nondepressed groups.[2]

Assessment of PSD

Careful assessment of depressive symptoms following stroke can lead to effective treatment and reduce morbidity from depression.

A variety of factors may hinder the diagnosis of PSD. Clinicians and family usually judge the patient's mood on his/her outward affective expression and other signs such as emotional lability and bradykinesia, but these signs may be unreliable in stroke patients. There may be a mismatch between the patient's affect and mood state. PSD patients may deny feeling sad or depressed and instead may cite somatic complaints.

The effects of stroke may mimic depression or impair emotional communication. Patients with aphasia may be depressed, but unable to report their feelings. Injury to the right hemisphere or frontal lobes may cause indifference, foolish and superficial affect, and lack of awareness or minimization of deficit.[1] Right hemisphere stroke can also impair emotional communication (dysprosody) despite intact propositional speech. The dysprosodic patient may appear flat, emotionally blunted, and depressed; the clinician must inquire about the patient's underlying mood state. Heightened emotionalism, with brief episodes of tearfulness, is common in the first year after stroke. Patients with heightened emotionalism may or may not have a full depressive syndrome. Patients with bilateral frontal lobe or subcortical injury may have marked emotional lability with

disinhibited laughing or crying. Patients with frontal or subcortical disease may also develop pseudobulbar palsy or pathological affect. These patients have difficulty controlling their emotions and may have brief outbursts of crying or laughing with minimal provocation. It is important to inquire about mood state during these outbursts as there is often a mismatch between emotional expression and underlying mood.

Apathetic symptoms may be difficult to distinguish from depression. In some cases apathy signals depression; in other cases apathy and decreased motivation occur in the absence of depressed mood or other core symptoms of major depression. Depression is characterized by a primary disorder of mood while apathy is largely a disorder of motivation. Most depressed patients report a subjective sense of unpleasant, dysphoric mood, but the apathetic patient often apears flat, shallow, and emotionally unconcerned. The apathetic patient loses the ability to initiate routine activities, but may be able to participate in activities initiated by others. In cases where apathy signals depression, it may persist as a residual finding despite improvement in mood and other depressive symptoms with antidepressant treatment. Careful assessment of subjective mood state and other vegetative and psychological symptoms of depression helps to distinguish between apathy as a syndrome and apathy as a symptom of depression. The distinction between apathy and depression may be important because the symptoms of apathy, seen either as an isolated syndrome or as a residual finding in partially treated depression, may respond differently to treatment.[10]

Fatigue, loss of energy and appetite, and insomnia are common symptoms of depression but are also common in acutely hospitalized stroke patients independent of depression and may be caused by the stroke, comorbid medical conditions, or medications. Fedoroff et al. found that the diagnosis of depression was usually distinguishable from the physical symptoms and malaise of stroke patients despite the frequency of vegetative symptoms in this population.[11]

To diagnose PSD, the clinician must observe the patient for signs of depression, apathy, and irritability, and inquire about the patient's appetite, weight loss, sleep patterns, and level of sexual interest and activity. The amnestic patient may not recall the duration or development of depressive symptoms. Obtaining information from family and nursing staff is extremely useful. Self-rating scales for depression such as the Beck Depression Inventory or clinician-administered scales such as the Hamilton Rating Scale for Depression may be helpful. For patients with aphasia, Stern's Visual Analog Mood Scale is simple to use.[12] Marin has developed a useful scale for rating apathy.[10]

Treatment of PSD

Depressive symptoms following stroke are often mild, and resolve without treatment. However, treatment should be initiated for patients with persistent and disabling symptoms. There are few controlled trials of the pharmacological treatment of PSD. Lipsey et al. conducted a randomized trial of nortriptyline vs. placebo in 34 patients with PSD and demonstrated significant improvement in depressive symptoms in patients treated with nortriptyline.[13] All patients who responded to nortriptyline had serum levels in the therapeutic range (50-150 ng/ml). In a randomized placebo controlled study, Reding et al. demonstrated improvement in scores of depression and activities of daily living (ADL) in patients treated with trazadone versus placebo.[14] Anderson et al. found significantly greater improvement in PSD patients treated with the serotonin reuptake inhibitor citalopram than placebo.[15] Open trials of low doses of the tertiary amine amitriptyline and serotonin-reuptake inhibitors have been shown to be beneficial in the treatment of pathological laughing and crying which sometimes follow stroke.[1]

Psychostimulant treatment of PSD has been examined in retrospective studies and in open trials. Lingam et al. reviewed the charts of 25 patients treated with methylphenidate for PSD and demonstrated a 50% response rate.[16] Masand et al. retrospectively studied 17 patients treated with either methylphenidate or dextroamphetamine for PSD and documented significant improvement in 82% of patients.[17] In a non-controlled prospective open trial, Lazarus et al. found that 8 of 10 patients with PSD responded fully or partially to treatment with methylphenidate.[18] Mood improvement was rapid (within 48 hours) and side-effects of anxiety, anorexia, tachycardia, and insomnia were minimal in all three reports. Patients in these studies were followed throughout inpatient hospitalization only, and were often discharged on more traditional antidepressants. Despite the increased risk of seizures after stroke, there were no reports of seizure complicating treatment with psychostimulants. There was no appreciable difference in efficacy or side-effects between patients treated with methylphenidate or dextroamphetamine. Low-doses of psychostimulants often aid in the treatment of apathy or mild depression following stroke; they may also be used to achieve an early and rapid improvement in depressive symptoms while more traditional antidepressant treatments are initiated.

The general maxim of "start low and go slow" in geriatric patients holds true in the treatment of PSD. The selection of anti-depressant medication for PSD is usually guided by a comparison of side-effect profiles between available medications. Tricyclic compounds (TCA), particularly the tertiary amines, amitriptyline and imipramine, can cause dry mouth, constipation, urinary retention, blurred vision, orthostatic hypotension, sedation, sexual dysfunction, delirium, and cardiac conduction disturbance. Relative contraindications to their use include narrow angle glaucoma, bladder outlet obstruction, and cardiac conduction defects. The serotonin reuptake inhibitors (SRI), as a whole, are better tolerated than the TCAs in the elderly depressed population. The SRIs can cause gastrointestinal distress, head-

ache, sexual dysfunction, anxiety, restlessness, myoclonus, Parkinsonism, and akathisia. Recognition of akathisia is important as it may be misidentified as an agitated component of a poststroke major depressive episode and lead to more aggressive titration of the causative agent.

Pharmacokinetic interactions must also be considered when prescribing SRIs. SRIs are highly protein-bound and may displace other protein bound medications from their serum binding site. The increased serum level of the displaced drug can lead to significantly increased clinical effect. Serum levels of coumadin may rise, requiring careful monitoring of coagulation studies in patients on coumadin and SRIs. SRIs have been shown to inhibit a number of hepatic P450 enzymes which may alter the metabolism of other commonly prescibed medications such as beta-blockers, TCAs, anticonvulsants, type IC antiarrhythmics, calcium channel blockers, benzodiazepines, antihistamines, and certain antibiotics.

Buproprion is a newer antidepressant with presumed dopaminergic effects that is relatively free of anticholinergic, cardiac, gastrointestinal, and sexual side effects. This low side-effect profile and its structural similarity to the amphetamines make it an attractive option in the treatment of PSD. However, the increased frequency of seizures in patients treated with buproprion may limit its use in the PSD population which is already at increased risk of seizure as a result of stroke.[19] Though nefazadone, venlafaxine, and mirtazapine have not been studied in the treatment of PSD, their low side-effect profiles and general efficacy in elderly depressed patients make them good treatment alternatives. Blood pressure elevation, a potential side effect of venlafaxine , may complicate treatment in patients with a history of hypertension. Monoamine oxidase inhibitors (MAOI) are effective anti-depressants but the dietary requirements and potential drug interactions limit their use in patients with PSD.

The data on ECT for PSD is very limited, but ECT may be a useful, relatively safe treatment. Murray and others conducted two retrospective studies of electroconvulsive therapy (ECT) in the treatment of PSD: 80-90% of patients had an excellent response.[20] The most common side-effect was amnesia and confusion for a period of hours before and after each treatment. The incidence of ECT-complications, however, was relatively high in this population. In one of these studies, 5 of 20 patients experienced significant ECT-related complications, including hypertension (one patient), severe interictal delirium requiring neuroleptics (two patients), pulmonary edema (one patient), and ventricular arrythmias associated with hypotension (one patient). All five patients had pre-existing cardiovascular disease. Despite these complications all five improved with ECT. Seven out of twenty patients experienced a relapse of depression in spite of maintenance treatment with antidepressant medication. In another study, ECT was an efficacious treatment for patients with major depression and subcortical microvascular disease, but post-ECT delirium was more pronounced. The principal contraindications to ECT are increased intracranial pressure, severe and poorly controlled hypertension, and unstable cardiac rhythm disturbances.

There are no systematic studies of the effectiveness of psychotherapy in the treatment of PSD.[8,19] Nonetheless, psychological therapies, often used to treat PSD, are generally considered helpful. Psychotherapy should be aimed at helping the patient and family adjust to the loss of function and compromised self-image and self-esteem. Diller and Bishop emphasize the need to adapt the mode of psychotherapy to the cognitive and language deficits of the patient; the more cognitively impaired the patient, the more behavioral and less verbal the treatment interventions.[19] Some family members are confused by the patient's change in emotion or personality. A spouse may feel that apathetic symptoms are willful or due to laziness. Psychoeducation is important. Helping the patient and family to understand the changes in physical and cognitive function, increase in caregiver

(continued on page 187)

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Diagnosis and Treatment of Post-Stroke Depression

Case 1

A 78 year old man with a history of hypertension and diabetes mellitus suffered a lacunar stroke in the head of the left caudate nucleus. Axial proton density MRI (Fig 1) demonstrated a confluent area of hyperintensity in the left caudate nucleus and anterior limb of the internal capsule, and moderate, diffuse subcortical hyperintensities consistent with microvascular disease. He became increasingly withdrawn six weeks after the stroke. Family members described decreased social interaction and diminished spontaneous speech. The patient reported feeling depressed. Anergia, anhedonia, initial insomnia, and decreased appetite were noted. Between the acute stroke and initial evaluation, the patient lost sixteen pounds. His primary care physician, who found him to be depressed, started him on amitriptyline 25 mg at bedtime. Amitriptyline was titrated to 50 mg but resulted in significant side effects of sedation, urinary retention, and orthostatic hypotension. The dose was returned to 25 mg with improvement in side-effects but persistent depressive symptoms and ongoing weight loss. Five weeks after initiating treatment he was referred to a psychiatrist, who documented marked psychomotor slowing and increased response latency. Amitriptyline was discontinued and sertraline started at 25 mg daily. He tolerated this dose without difficulty, and sertraline was increased to 50 mg daily after one week. On 50 mg of sertraline he experienced side-effects of nausea and diarrhea. Appetite and oral intake decreased further. He became dehydrated with a serum sodium of 150 mmol/liter measured after four weeks of treatment with sertraline. He was admitted to a geriatric psychiatry unit where IV hydration was started. Given his difficulty tolerating two antidepressant trials, marked decline in function, and significant dehydration, ECT was recommended. A family meeting was held to discuss the risks and benefits of ECT. The patient was initially reluctant, but, with encouragement from his family and education from the psychiatrist, agreed to the ECT. He received six unilateral non-dominant treatments over two weeks. He developed mild amnesia and confusion for twenty-four hours after each treatment. Mood improved dramatically. Hamilton Depression Rating Scale scores dropped from 28 pre-treatment to 8 post-treatment. Speech became more spontaneous. Appetite returned to normal. Maintenance pharmacologic treatment with nortriptyline was begun. Nortriptyline was titrated to 50 mg at bedtime resulting in a therapeutic serum level of 80 ng/ml and minimal side effects. His depressive symptoms have been in remission for the past 24 months.

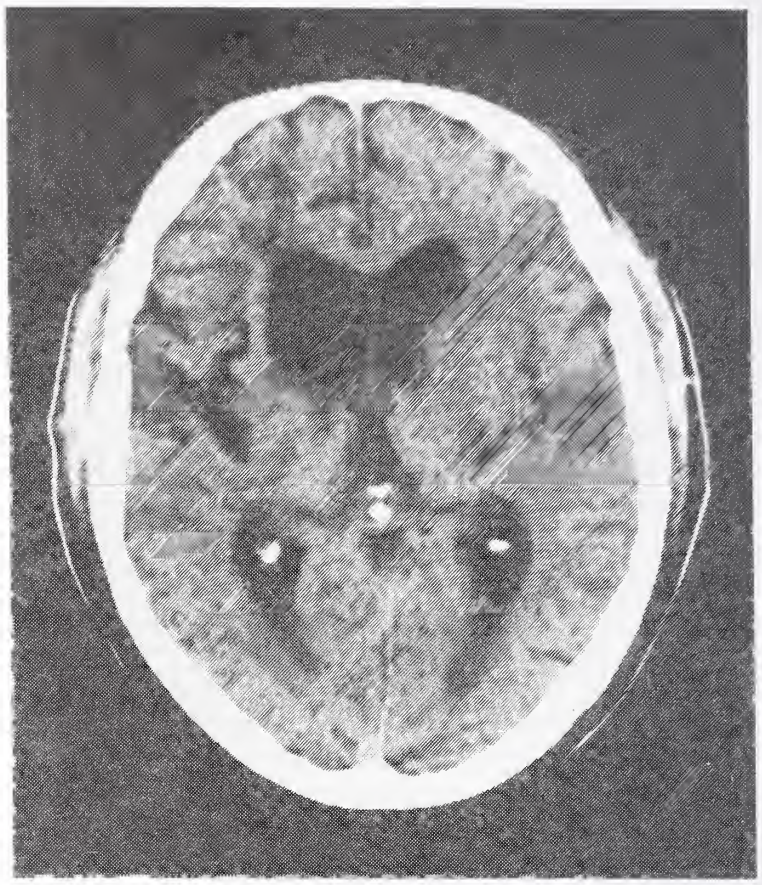
Amitriptyline is an effective antidepressant, but, as a tertiary amine, it is associated with significant side effects and should not be chosen as a first line agent in elderly patients with PSD. Nortriptyline, a secondary amine metabolite of amitriptyline, is equally effective and is associated with fewer side- effects. Patients who are unable to tolerate the side effects of tertiary amine tricyclic antidepressants may respond well to secondary amine agents in the same class. SRIs are usually better tolerated than tricyclic antidepressants. However, gastrointestinal side effects combined with poor oral intake caused significant dehydration and limited the use of sertraline in this patient. ECT is a safe and effective treatment for most patients with PSD. ECT produced amnesia for events around the time of each treatment, and, as was seen in this case, the amnesia often lasts longer in patients with underlying brain disease.

Case 2

A 60 year old man with hypertension developed the abrupt onset of left-sided weakness, arm > leg, and slurred speech. He was found to have 100% occlusion of the right carotid artery and infarction involving the right head of the caudate nucleus along with a wedge-shaped infarction in the right lateral frontal lobe at the junction of the anterior and middle cerebral artery distributions (Fig 2). The left hemiparesis persisted and he lost the use of his left hand. He was able to walk again with the help of a brace for the left leg. Soon after the stroke he was noted to be depressed, with loss of interest, depressed mood, very low energy and motivation, and decreased appetite. His primary care doctor started treatment with nortriptyline. After ad-

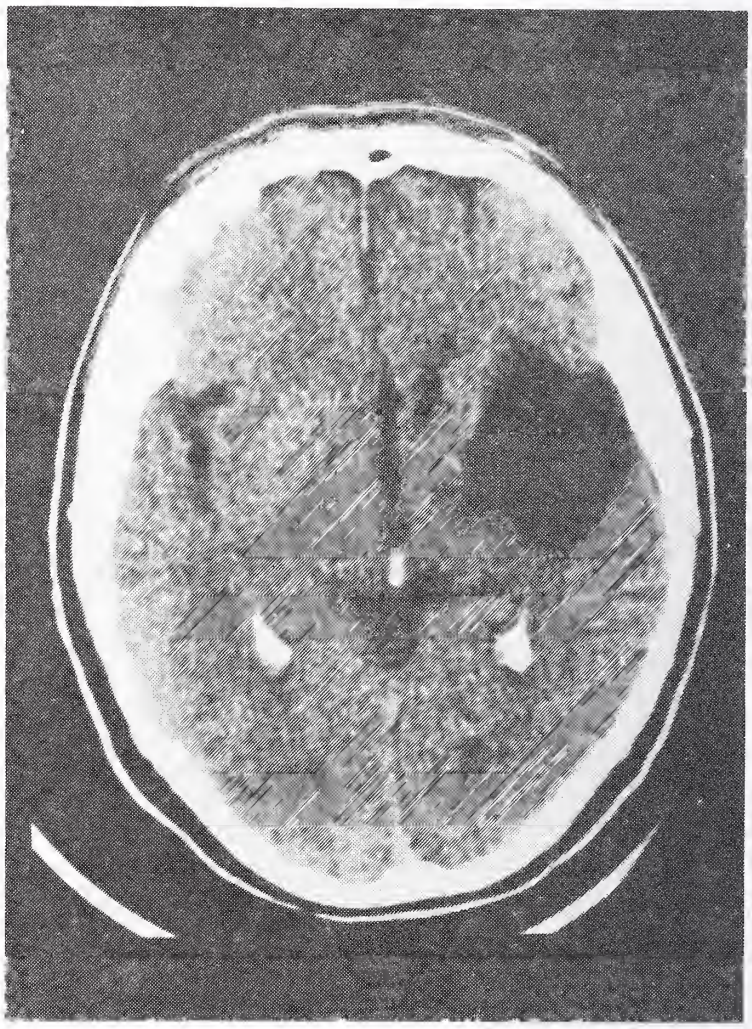
justment of the dose his depressed mood improved on nortriptyline 40 mg/day. However, symptoms of low energy and motivation persisted for many months. Increasing the dose of the nortriptyline had no effect on these symptoms. He was referred for neuropsychiatric evaluation; methylphenidate 5 mg was begun with initial improvement of energy and motivation. The dose was increased to 5 mg in the morning and at noon. He has remained euthymic; and symptoms of apathy have been in remission for the past year on a combination of low-dose nortriptyline and methylphenidate.

This case demonstrates the occurrence of major depression and apathy following frontal/caudate stroke. The depressed symptoms responded well to low doses of nortriptyline, but low energy and motivation persisted after depressed mood and vegetative symptoms resolved. His apathetic symptoms could be residual symptoms of a partially-treated depression but given the strong association between apathy and caudate stroke, the patient's ability to clearly distinguish the symptoms of apathy and depression, and the differential response of depressed mood to nortriptyline and apathy to methylphenidate, we propose that the depression and apathy are independent, but closely-related symptoms in this patient.



Case 3

A 72 year old right-handed woman with atrial fibrillation developed an acute myocardial infarction requiring emergency coronary artery bypass grafting. After surgery she was noted to have a mixed aphasia and right hand weakness. CT scan of the brain revealed a partial left middle cerebral artery infarction (Fig 3) presumably caused by a cardio-embolic event. She was placed on coumadin. Occasional seizures were treated with phenytoin. She spent one month in the rehabilitation unit and 12 months in a nursing home but eventually returned home. One year after the stroke she complained of low energy and loss of interest. Appetite and sleep were normal; she denied depression. Methylphenidate was started at 5 mg in the morning with improvement in energy level and increased interest in activities. She became much more active around her home. Apathetic symptoms have remained in remission for the past two years on methylphenidate 5 mg/day. No significant side-effects have been reported.



Case 3 represents a case of mild, persistent apathy without depression following stroke. The apathetic symptoms responded well to low doses of methylphenidate without adverse effects. The patient's course was complicated by emergency cardiac surgery, left hemisphere stroke causing aphasia and hemiparesis, and post-stroke seizures. She spent an extended period in a nursing home. Her symptoms of apathy were not recognized and treated until her seizures were better controlled and she had returned home. The delay in recognition of her apathetic symptoms until one year after the stroke may have been due to her multiple neurological problems post-stroke and inadequate monitoring in the nursing home. Alternatively, the apathetic symptoms may have been delayed due to reorganization of brain regions regulating drive and motivation following the stroke.

responsibilities, and the changes in the patient's role within the family, can improve the family's quality of life after stroke.

The severity of physical disability secondary to stroke does not correlate well with the incidence of PSD. Chronic functional impairment, however, may contribute in part to the development of PSD. Though randomized trials of active physical therapies have not demonstrated efficacy in the treatment of PSD, rehabilitation remains an important part of treatment after stroke.[8]

If depressive symptoms persist and interfere with the patient's ability to function, treatment should be initiated. Ask the patient and family about the impact of the stroke and depression on the patient's functioning and family life, and provide them with information and counseling about stroke and depression. Consider treatment with an antidepressant. We normally begin with a low-dose secondary amine tricyclic compound such as nortriptyline or a low dose of an SRI such as sertraline. The dose is adjusted over the next few weeks. Blood levels of TCAs may help guide dose adjustments. Carefully monitor side-effects. After 6-8 weeks of therapy at adequate doses, non-responders should be switched to another compound, probably of a different class of antidepressant. Low-dose lithium or thyroid hormone may augment the antidepressant response for partial responders. Trazodone, a non-addictive agent for treating insomnia, can be prescribed in low doses in combination with another antidepressant. Apathetic symptoms may respond to treatment with low doses of psychostimulants given once or twice early in the day. The psychostimulants can be used in combination with the TCAs or SRIs if needed. Prominent psychotic symptoms associated with depression may respond to treatment with low-dose neuroleptics. Pseudobulbar affect should be treated with low doses of amitriptyline (25 mg) or low doses of an SRI (fluoxetine 10 mg). ECT should be reserved for patients who fail to respond to antidepressants or who are markedly disabled by their depressive symptoms.

Cases 1, 2, and 3 highlight the presentation and treatment of depression and apathy following stroke.

Summary

Depression is common after stroke but the diagnosis may be difficult. Anterior and subcortical brain lesions increase the risk of depression. It is important to make an accurate diagnosis of PSD as treatment may reduce morbidity. Treatment should consist of family support, education and anti-depressant medication.

References

1. Starkstein SE, Robinson RG. Neuropsychiatric aspects of cerebral vascular disorders, in *The American Psychiatric Textbook of Neuropsychiatry.* Edited by Yudofsky SC, Hales RE. Washington, DC, APA Press, 1992: 449-472.
2. Robinson RG, Starkstein SE. Current research in affective disorders following stroke. *J Neuropsych Clin Neurosciences* 1990;2(1):1-14.
3. Parikh RM, Robinson RG, Lipsey JR, et al. The impact of poststroke depression on recovery in activities of daily living over a two year follow-up. *Arch Neurol* 1990;47:785-789.
4. Morris PLP, Robinson RG, Andrzejewski P.et al. Association of depression with ten-year poststroke mortality. *Am J Psychiatr* 1993;150(1):124-129.5. House A. Dennis M, Warlow C, et al. Mood disorders after stroke and their relation to lesion location. *Brain* 1990;113: 1113-1129.
6. Mayberg HS, Frontal lobe dysfunction in secondary depression. *J Neuropsychiatry Clin Neurosciences* 1994;6(4): 428-442.
7. Robinson RG, Kubos KL, Starr LB, et al. Mood disorders in stroke patients: importance of location of lesion. *Brain* 1984;107:81-93.
8. House A. Depression associated with stroke. *J Neuropsychiatry Clin Neurosciences* 1996;8(4):453-457.
9. Mayberg HS, Robinson RG, Wong DF, et al. PET imaging of cortical S2 receptors after stroke: lateralized changes and relationship to depression. *Am J Psychiatry* 1988;145(8):937-943.
10. Marin RS, Fogel BS, Hawkins J, et al. Apathy: a treatable syndrome. *J Neuropsychiatry Clin Neurosciences* 1995;7(1):23-30.
11. Fedoroff JP, Starkstein SE, Parikh RM, et al. Are depressive symptoms nonspecific in patients with acute stroke? *Am J Psychiatry* 1991;148(9):1172-1176.
12. Stern RA. Assessment of mood states in neurodegenerative disease: methodological issues and diagnostic recommendations. *Sem Clin Neuropsychiatry* 1996;1(4):315-324.
13. Lipsey JR, Robinson RG, Pearlson GD, et al. Nortriptyline treatment of post-stroke depression: a double-blind study. *Lancet* 1984;1:297-300.
14. Reding MF, Orto LA, Winter SW, et al. Antidepressant therapy after stroke: a double-blind trial. *Arch Neurol* 1986;43:763-765.
15. Andersen G, Vestergaard K, Lauritzen L. Effective treatment of poststroke depression with the selective serotonin reuptake inhibitor citalopram. *Stroke* 1994;25:1099-1104.
16. Lingam VR, Lazarus LW, Groves L, Oh SH. Methylphenidate in treating poststroke depression. *J Clin Psychiatry* 1988;9(4):151-153.
17. Masand P, Murray GB, Pickett P. Psychostimulants in post-stroke depression. *J Neuropsychiatry Clin Neurosciences* 1991;3(1):23-27.
18. Lazarus LW, Winemiller DR, Lingam VR, et al. Efficacy and side effects of methylphenidate for poststroke depression. *J Clinical Psychiatry* 1992;53(12): 447-449.
19. Diller L, Bishop DS. Depression and stroke. *Topics in Stroke Rehabilitation* 1995;2(2):44-55.
20. Currier MB, Murray GB, Welch CC. Electroconvulsive therapy for post-stroke depressed geriatric patients. *J Neuropsychiatry Clin Neurosciences* 1992;4(2):140-144.

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Stroke Rehabilitation

Jon Mukand, MD, PhD, and Sergey Wortman, MD

Stroke is the second most frequent cause of disability and one of the most expensive medical conditions in the United States[9,14] because it usually occurs in older individuals and is associated with other medical illnesses. The high incidence of stroke, the resulting multiple disabilities, and our increasingly older population place stroke rehabilitation at a high priority. In this article we discuss prognosis, the medical management of associated conditions, and rehabilitation strategies for the most common disabilities.

A screening examination for rehabilitation prognosis should be performed as soon as the patient's medical condition stabilizes. The World Health Organization recommends dividing all stroke survivors into three categories with regard to prognosis: 1) patients who spontaneously recover without rehabilitation; 2) patients who can make a satisfactory recovery only through intensive rehabilitation and; 3) patients with poor recovery of function regardless of the type of rehabilitation.[20] Prognostic indicators for poor rehabilitation outcomes include coma at onset, bladder/bowel incontinence two weeks after stroke, cognitive dysfunction, visual-spatial deficits, advanced age, a previous stroke, no motor return within one month, significant cardiovascular disease, and large, deep lesions on CT scan.[10] Patients with left (vs. right) hemiplegia have better outcomes if there is no spatial agnosia, but left hemiplegic patients with spatial agnosia have a worse prognosis than do both right and left hemiplegic patients without visual-spatial deficits.[10,18]

The Functional Independence Measure (FIM) is a score of basic self-care skills, mobility, bowel/bladder function and social/cognitive skills; lower initial scores are a poor prognostic sign.[19] The earliest prognostic indicators of poor outcome are large cerebral lesions on the CT scan and significant deficits with cerebral tissue perfusion on SPECT scan at 24 to 48 hours after the CVA.[9]

The risk of deep venous thrombosis (DVT) and pulmonary embolism is increased by the paralysis of a limb and resulting immobility. Although DVT of the lower extremity occurs in 30% to 50% of patients, it may not be detected clinically in the paralyzed leg. The risk of pulmonary embolism associated with the DVT is approximately 10%.[10] Pooled results from randomized trials have shown a 45% risk–reduction with prophylaxis using low-dose heparin and a 73% reduction with low-molecular-weight heparin.[12] Heparin is the preferred prophylaxis for DVT, but warfarin[4] and intermittent pneumatic compression are also effective.[9] In some cases warfarin may be necessary for stroke prophylaxis, which also addresses DVT prevention. Non-invasive Doppler studies are diagnostic for proximal DVTs, but a venogram should be considered in ambiguous cases. Because of the high incidence of this complication, early mobilization is ideal, as is daily examination of the lower extremities for discoloration, edema, or pain upon movement. Calf and thigh girths should be measured early in the patient's course and periodically during rehabilitation.

The National Survey of Stroke found that 16.5% of patients with stroke develop skin breakdown.[9,14] Patients who are comatose, severely paralyzed, obese, incontinent of bladder or bowel, or who have muscle spasticity are at high risk. Systematic daily inspection of the skin with particular attention to areas over bony prominences helps detect areas of incipient breakdown. Gentle routine skin cleansing and protection from excessive moisture are important, as is proper positioning in the bed and wheelchair to reduce pressure at bony prominences. Turning the patient in bed every two hours and training with pressure relief techniques in the wheelchair are effective strategies. Careful transfer techniques when moving the patient from bed to chair will help reduce skin trauma. Barrier sprays and emollients should be used at pressure areas. Special mattresses and protective orthoses, especially at the heels, help maintain skin integrity, as do adequate hydration and nutrition. Vitamin C supplementation may be necessary for wound healing.

Dysphagia occurs in 33-50% of patients, with the highest incidence in patients with brainstem infarcts.[17] Complications of dysphagia include malnutrition,[4] dehydration, and aspiration pneumonia. One-third of patients with dysphagia will have aspiration; of these, 40% have silent aspiration, without coughing or choking during meals.[10] Dysphagia evaluation at the bedside by the speech pathologist is important, but a modified barium swallow (MBS) is essential to define specific abnormalities in the swallowing process. The MBS is also a good opportunity to evaluate compensatory strategies. The management of dysphagia includes changes in

Abbreviations Used:

ADL	Activities of daily living
AFO	Ankle-foot orthosis
CT	Computed tomography
CVA	Cerebrovascular accident
DVT	Deep venous thrombosis
FIM	Functional Independence Measure
INRU	Intensive Neurorehabilitation Unit
KAFO	Knee-ankle-foot orthosis
MBS	Modified barium swallow
OT	Occupational therapy
ROM	Range of motion
SPECT	Single photon emission computed tomography

posture and head positioning, swallowing maneuvers such as the chin-tuck, modified textures of foods (thickened liquids, pureed foods), and smaller bolus size. For patients with ineffective oral food transport, a syringe or glossectomy spoon can deliver food to the oropharynx. Other interventions include oral-motor exercises for the tongue and lips to increase strength, range of motion, velocity, and precision. The role of thermal stimulation with cold spoons is unclear. Patients who do not regain the ability to swallow safely will require parenteral or tubal feeding. If long-term feeding is required, a gastrostomy is usually preferable to a nasogastric tube.

The incidence of urinary incontinence is 50-70% during the first month after stroke and about 15% after 6 months.[10,15] Causes include neurological deficits that lead to bladder hypertonicity, bladder hypotonicity with overflow incontinence, urinary tract infections, constipation, and cognitive or communication deficits. Persistent incontinence suggests a poor long-term prognosis for functional recovery.[11] Urinary incontinence may cause skin breakdown, social embarrassment, and depression; it also increases the risk of institutionalization. The most important therapeutic approach to the neurogenic bladder from a stroke is a timed bladder-emptying schedule. Offering the patient a urinal or bedside commode every two hours while awake and prior to sleep, in addition to regulation of fluid intake, will often resolve the incontinence. An indwelling catheter should be limited to severe urinary retention, patients with skin breakdown in whom frequent bed or clothing changes are difficult or painful, and when incontinence prevents monitoring of fluid balance. If a catheter is necessary, Vitamin C should be used for the prevention of urinary tract infections.

Bowel incontinence affects about 31% of patients, but usually resolves within two weeks after the neurologic event.[15] Persistent fecal incontinence may reflect severe damage to areas of the brain that serve cognitive function. Constipation and fecal impaction are more common after a stroke than incontinence. Contributing factors include inactivity, inadequate fluid or food intake, depression or anxiety, a neurogenic bowel (e.g. impaired gastric emptying in diabetic patients), and cognitive deficits. Management should emphasize a toileting schedule that takes advantage of the gastrocolic reflex, dietary fiber, adequate fluid intake, training in toilet transfers, and improved communication. Stool softeners, sometimes in combination with peristaltic agents (such as Pericolace), may be required. In some cases, suppositories help, but their use should be limited to the initial stage of bowel retraining.

The process of rehabilitation should begin in the acute setting, as soon as the patient is medically and neurologically stable. Depending on the patient's level of function, specific goals should be set after discussion with the patient and the family ...

A significant number of patients develop aphasia,[10] usually due to a lesion in the left hemisphere (dominant for language in 85% of all people). Nonfluent, or Broca's, aphasia impairs expressive and repetition abilities, but comprehension is preserved. Fluent, or Wernickes' aphasia affects comprehension and repetition, but preserves expression; speech is often nonsensical. Global aphasia causes loss of both expression and comprehension abilities, resulting in nonfluent or absent speech. Frontal lobe involvement may cause markedly reduced speech output or even mutism. Aphasic patients should be evaluated by a speech pathologist with careful analysis of all language modalities (auditory comprehension, visual-perceptual function, speech, writing). The goals of aphasia rehabilitation are to 1) remediate the ability to speak, comprehend speech, read, and write; 2) develop strategies that compensate for communication deficits; 3) address associated psychological problems that compromise communication; and 4) help the family and community members interact with the patient. Because of the anxiety associated with aphasia rehabilitation, some patients may benefit from low-dose anxiolytics before sessions with the speech pathologist.

For dysarthric speakers, treatment strategies include sensory stimulation; strengthening of oral musculature; improved muscle tone; modified posture for optimal speech; and improved respiratory efficiency.[9] Dysarthric patients should produce speech under carefully arranged and controlled conditions. Severely impaired dysarthric and apraxic speakers may benefit from augmented communication strategies, including pre-recorded messages on communication boards and books.

Strokes affect motor function in several ways, causing weakness of the extremities and oral-facial muscles, reduced abdominal and spinal muscle tone, spasticity, and synergy patterns. After a stroke, reflexes and voluntary movement are depressed initially and the affected muscles are flaccid. The muscles regain function within days to weeks, develop hyperactivity over a period of weeks to months, and become less hyperactive as voluntary movement recovers. This pattern of recovery may be arrested at any point, leaving residual weakness and hypo- or hyperreflexia. Functional electrical stimulation, especially when combined with biofeedback, may assist the recovery process.

Spasticity can cause pain or interfere with ADLs, especially hygiene, bathing and dressing. Ambulation is also affected. Ankle clonus and hip adductor scissoring; deficient hip, knee and ankle flexion during the swing phase of gait; and exaggerated knee and ankle extension during the stance phase are characteristic of a hemiplegic gait.[8]

These abnormalities severely affect the patient's mobility and energy expenditure, resulting in a greater risk of cardiac events.[1] Daily range of motion (ROM) exercises are essential to spasticity management, which also includes proper positioning and orthotics. Other strategies include serial casting, motor point or peripheral nerve blocks with phenol or botulinum toxin, oral medications such as dantrolene (the drug of choice for patients with cerebral spasticity), and surgical release. An ankle-foot orthosis (AFO) is used to control a spastic equinus deformity at the ankle.[13] Medial or lateral straps or a custom-molded plastic brace can help control varus or valgus tendencies at the ankle.

Orthotic management is best accomplished in the majority of hemiplegic patients with the use of plastic orthoses,[8] but lack of sensation and fluctuating edema are relative contraindications to these devices. In such cases, specially designed shoes with metal uprights are best. Lower extremity orthotic devices should be considered if ankle or knee stabilization is needed to help the patient walk. Prefabricated bracing may be used initially, with more expensive customized bracing reserved for patients with a long-term need. An Ace bandage or Theraband may be used for dorsiflexion to assess the need for a brace.

Similarly, a knee immobilizer may help the patient regain motor function in the early stages of gait training and alleviate the need for a knee-ankle-foot orthosis (KAFO). A KAFO is rarely indicated in stroke rehabilitation because it is cumbersome and may hinder motor recovery; it may be useful for severely impaired patients who require stabilization of the lower extremity for transfers. With properly timed use of orthotic devices, gait training can be conducted simultaneously with muscle strengthening, and reduce the energy cost of ambulation.[9]

Prior to orthotic fitting, serial casting or blocks with phenol or botulinum toxin can be used to control spasticity, decrease pain, and improve range of motion.[1,2] The most common motor point blocks are for the tibialis posterior and gastrocnemius. Nerve blocks for the obturator and tibial nerves are often effective for scissoring at the hips and equinovarus spasticity, respectively. A variety of orthopedic procedures can increase function, correct deformities, or improve cosmesis. These relatively minor surgeries include tenotomy, tendon lengthening, and tendon transfer. The latter two are most useful if voluntary movement is preserved. It is ideal to consult a physiatrist, or specialist in rehabilitation medicine, for questions about specific orthoses or the functional impact of the orthopedic surgery.

Occupational therapy (OT) is essential to interdisciplinary rehabilitation.[10] The occupational therapist emphasizes fine motor skills and cognition; evaluates and retrains patients in ADL skills such as dressing, hygiene, bathing, and eating; provides ROM, strengthening, and coordination exercises for the upper extremity; recommends orthoses for the upper extremities; provides splinting and serial casting; recommends adaptive equipment and arranges home modifications as needed. Adaptive devices should be used only if patients with impaired ADL skills cannot learn compensatory strategies. Some examples include eating utensils with built-up handles for a weak grasp, grab bars for safety in the shower, long-handled sponges for limited reach, elevated toilet seats with rails, and Velcro closures for one-handed dressing.[9] The need for these devices is determined by the patient's functional deficit and the home environment.

Cognitive dysfunction after stroke is an important cause of disability and may impede rehabilitation.[7,18] Cognitive rehabilitation should address orientation, attention, reasoning, insight, judgment, and short and long-term memory. Reorientation can be accomplished through pictures of family members, large clocks and calendars, and activity groups that anchor the patient in time and space. Patients often respond well to computer training because of its flexibility, diversity, and multiple visual and auditory feedback mechanisms built into these programs. Right hemisphere strokes result in a variety of behavioral syndromes, including denial, left neglect, visual-spatial deficits, apraxia, and delirium. Careful evaluation during functional tasks and with a standardized instrument such as the Behavioral Inattention Test should precede rehabilitation for each behavioral syndrome.

Severely affected patients may require cognitive rehabilitation in a locked unit for safe behavioral management. Our locked Intensive Neurorehabilitation Unit (INRU) provides a carefully controlled environment that includes video monitoring of private rooms. To prevent injuries caused by physical restraint and to minimize chemical restraints - both of which adversely affect recovery - our INRU has net beds that allow some

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freedom in a safe enclosure. The most important aspect of an intensive unit, however, is a skilled team that can implement the fine points of a neurobehavioral rehabilitation program. Formal and informal meetings on a regular basis are essential to a coordinated interdisciplinary approach for these challenging patients.

Psychosocial aspects of stroke recovery should receive intensive attention.[4,10] Patients require monitoring for anxiety and depression, which are common after a stroke and affect the rehabilitation assessment and outcome. Motivation plays an important role in successful rehabilitation. Many psychosocial problems face patients and their families, including psychological, social, familial, and economic stresses. These problems may emerge after discharge, rather than during the acute rehabilitative phase. The social worker can provide psychosocial evaluation and support during rehabilitation, can facilitate family-patient discussion groups focusing on adjustment to disability, can interpret insurance coverage to help obtain post-discharge rehabilitation services, and can inquire into family support and the availability of community assistance (such as Meals on Wheels, senior citizens groups, and stroke clubs). The social worker is a vital link to assist the patient's reintegration into the community.

Stroke rehabilitation is complex because of the multiple neurologic abnormalities that occur in a variety of combinations, with different levels of severity. Associated medical conditions and complications may further modify the patient's clinical status, necessitating adjustments in the rehabilitation program. For instance, a patient with severe cardiac disease may not be able to tolerate the three hours of daily therapy provided in an acute rehabilitation center, but may benefit from a less intense level of services in a subacute rehabilitation setting. Conversely, as a patient's endurance improves, a transfer back to the acute rehabilitation setting should be considered to provide the optimal clinical benefit for the patient. In less severe strokes, and if the patient's medical condition is stable, rehabilitation in the home or outpatient settings may be considered. These decisions will be affected by the initial clinical picture, which guides prognosis, and should help to determine the patient's optimal placement in the post-acute continuum of care. Whatever setting is recommended, it should have an interdisciplinary team of professionals including a physician trained and experienced in rehabilitation, a rehabilitation nurse, a physical therapist, an occupational therapist, and a speech language pathologist. Consultations should be readily available from a variety of specialists, especially urology, psychiatry, and neuropsychology, and, for patients with multiple medical conditions, cardiology, infectious diseases, and endocrinology.

Optimal stroke rehabilitation requires the prevention and prompt treatment of a variety of complications. Rehabilitation should begin in the acute setting, as soon as the patient is medically and neurologically stable. Depending on the patient's level of function, specific goals should be set after discussion with the patient and the family to help plan for discharge, taking into account the patient's psychosocial situation and living conditions. The Functional Independence Measure (FIM) is useful for monitoring the patient's progress with rehabilitation. A lack of progress on the FIM may suggest ongoing medical problems that are then addressed to help the patient participate in rehabilitation. Specific areas of the FIM that show minimal gains, such as dressing or bladder function, may lead to an adjustment of the team's therapeutic efforts. Utilization review is another important function served by the FIM; lack of progress in spite of optimal medical status and rehabilitation therapies indicates a possible transfer to the subacute, home, or lengthening care setting. Our Center's FIM data, compared to the region and nation, ensures that we meet quality standards and continue refining our program.

In the rehabilitation setting the patient should receive education, emo-

tional support, assistance with ADLs, strategies to compensate for various disabilities, repetitive practice in a controlled setting, and feedback for self-correction. The family should be involved with the patient's rehabilitation as much as possible, unless their presence inhibits the patient's independence. The general approach in rehabilitation is to provide a great deal of assistance and training, but gradually to withdraw these, to help the patient achieve maximal functional independence. Initially the patient may appear passive, but gradually the team will help the patient regain autonomy. Although a team of professionals is involved in the patient's rehabilitation, the most important member is the patient.

References

1. Beekerman H, Becher J, Lankhorst GJ, Varbeck ALM. Walking ability of stroke patients: efficacy of tibial nerve blocking and polypropylene ankle-foot orthosis. *Arch Phys Med Rehabil* 1996; 77:S1144-S1151.
2. Bhatka BB, et al: Use of botulinum toxin in stroke patients with severe upper–limb spasticity. *J Neurol Neurosurg Psychiatry* 1996; 61:30-35.
3. Brandstater ME, Roth EJ, Siebens HC: Venous thromboembolism in stroke: Literature review and implications for clinical practice. *Arch Phys Med Rehabil* 1992; 73:S373-S381.
4. Berk SN, Schall RR. Psychosocial factors in stroke rehabilitation: critical factors for successful outcome: *Phys Med Rehabil Clin North Am* 1991; 2(3):547-562.
5. Clagett GP, Anderson FA, Levin MN et al. Prevention of venous thromboembolism. *Chest* 1992;102(4): (suppl) 391S-427S.

6. Dessmond DW et al. Recovery of cognitive functions after stroke. *Stroke* 1996; 27(10):1798-1803.
7. Desmukh M, Bisignani MN, Landau P, Orchard TJ. Deep vein thrombosis in rehabilitating stroke patients: incidence, risk factors, and prophylaxis. *Am J Phys Med Rehabil* 1991; 70:313-16.
8. Esquenazi A, Hirai B. Assessment of gait and orthotic prescription. *Phys Med Rehabil Clin North Am* 1991; 2(3):473-485.
9. Gresham GE, Duncan PW, Stason WB, et al. *Post-stroke rehabilitation.* Guideline report, No. 16: [AHCPR Publication No. 95-0662.] Rockville, MD. Agency for Health Care Policy and Research, 1995.
10. Garrison SJ, Rolak LA. Rehabilitation of the stroke patient. In DeLisa JA, Currie D, Gans B, et al., eds. *Principles and Practice of Rehabilitation Medicine,* 2nd ed. Philadelphia: JB Lippincott, 1993.
11. Gelber DA, Good DC, Laven LJ et al. Causes of urinary incontinence after acute hemispheric stroke. *Stroke* 1993; 24(3):378-82.
12. Laudi G, D'Angelo A, Boccardi E et al. Venous thromboembolism in acute stroke. Prognostic importance of hypercoagulobility. *Arch Neurol* 1992; 43:273-83.
13. Orif R, Heiner S. Orthoses and ambulation in hemiplegia: ten year retrospective study. *Arch Phys Med Rehabil* 1980; 61:216-220.
14. Prescott. Survey shows stroke to be one of the most expensive medical illnesses in the United States. Internal Medicine World Report. 1994; 3(12):1-5.
15. Roth EJ, Noll SF. Stroke rehabilitation: Comorbidities and complications. *Arch Phys Med Rehabil* 1994;75:S42-S46.
16. Sandercock P, Willems H. Medical treatment of acute ischemic stroke. *Lancet* 1992; 333:537-9.
17. Smithard DG et al. Complications and outcome after acute stroke: Does dysphagia matter? *Stroke* 1996;27:1200-1206.
18. Stineman MG, Granger CV. Epidemiology of stroke-related disability and rehabilitation outcome. *Phys Med Rehabil Clinic North Am* 1991;(3):457-471.
19. Week JE et al. Factors predictive of stroke outcome in rehabilitation settings. *Neurology* 1996;47:388-392.
20. World Health Organization. Stroke-1989. Recommendations on stroke prevention, diagnosis and therapy: report of the WHO Task Force on stroke and other cerebrovascular disorders. *Stroke* 1989; 20(10):1407-31.

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Obesity Hyperventilation Syndrome in the Differential Diagnosis of a Pulmonary Mass

Richard F. Lain, MD, Christopher Superczynski, MD, and Robert S. Crausman, MMS, MD, FCCP

Case Summary:

A 61 year old obese (5'2", 320lb) white male with a 45-year smoking history presented to the emergency department with cyanosis. He had been in his normal state of health until 9 days earlier when he arrived in Denver (elevation 5,280 feet) from Texas on business by airplane. Although he claimed to be asymptomatic, his wife had noticed bluish-black discoloration of his skin and insisted upon a medical evaluation. On chest radiograph he was found to have a right lower lobe pulmonary mass with apparent hilar adenopathy (figures 1,2). He denied any medical problems, but did note dyspnea on mild exertion, daytime somnolence, and frequent headaches that had been worsening over recent months. His wife further noted that he snored loudly while sleeping and had frequent nocturnal apneas.

On physical examination, his vital signs were normal and he was breathing easily on room air. He was obese, with a small posterior oropharynx, an 18.5 inch neck circumference and was markedly cyanotic. On auscultation his breath sounds were clear; he had an accentuated second heart sound (P2) and minimal bilateral lower extremity edema.

Laboratory studies revealed a low platelet count of 118,000/mm^3, a normal white blood cell count of 12,000/mm^3, and an elevated hematocrit of 65%. His serum sodium, potassium, chloride, blood urea nitrogen, creatinine and glucose were all normal. His pulse oximetry was 64% on room air and an arterial blood gas was obtained with the following results: pH = 7.36 (normal 7.36 - 7.44), PaCO2 = 58 Torr (normal 32 - 38), PaO2 = 37 Torr (normal > 65), bicarbonate = 29 meq. (normal 24 - 28) and AaPO2 gradient = 15.5 Torr (normal < 20).

Figures 1,2: PA and lateral chest radiographs of a 61 year old, obese white male with unexplained hypoxia.

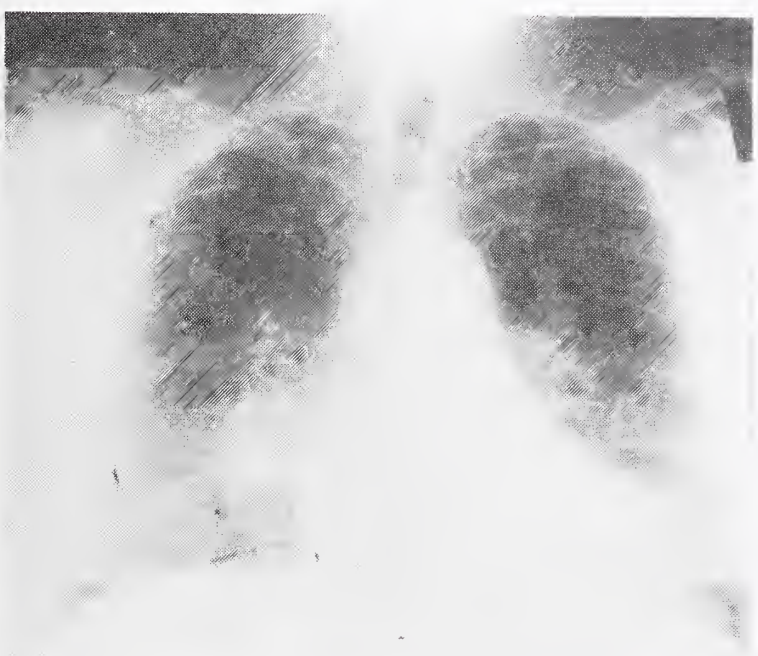

Figure 1: PA chest radiograph with suspicious right lower zone mass initially mistaken for a pulmonary neoplasm. However, its smooth borders and location suggest its vascular nature.

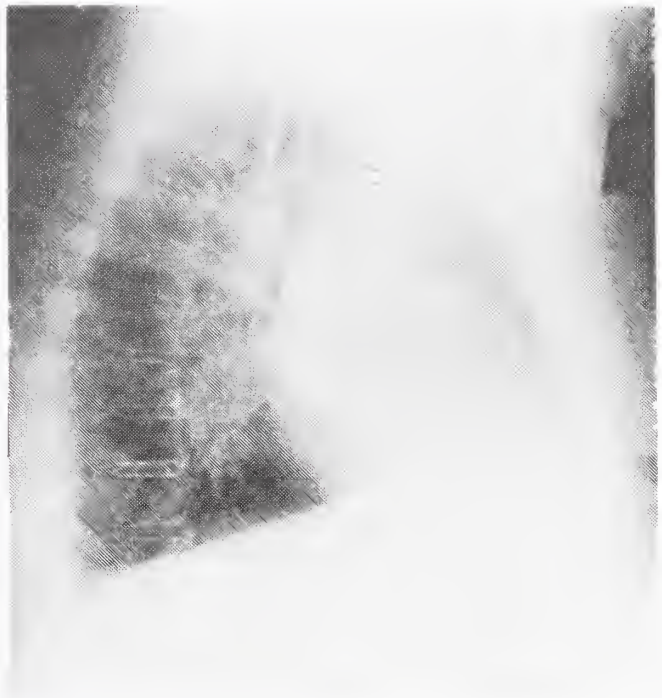

Figure 2: Lateral chest radiograph with prominent left descending pulmonary artery and right pulmonary artery.

Discussion

This patient presents a classic picture of the obesity-hypoventilation syndrome, also known as the Pickwickian Syndrome. The clinical association of extreme obesity, somnolence, polycythemia and hypoventilation was first recognized by Burwell[2] and was named in reference to the "fat and red-faced boy in a state of somnolency" described in Dickens' novel *The Pickwick Papers.* This syndrome has since been recognized widely in both clinical practice

Abbreviations Used:

COPD	Chronic obstructive pulmonic disease
CPAP	Continuous positive airway pressure
CT	Computerized tomography
PA	Posterio-anterior

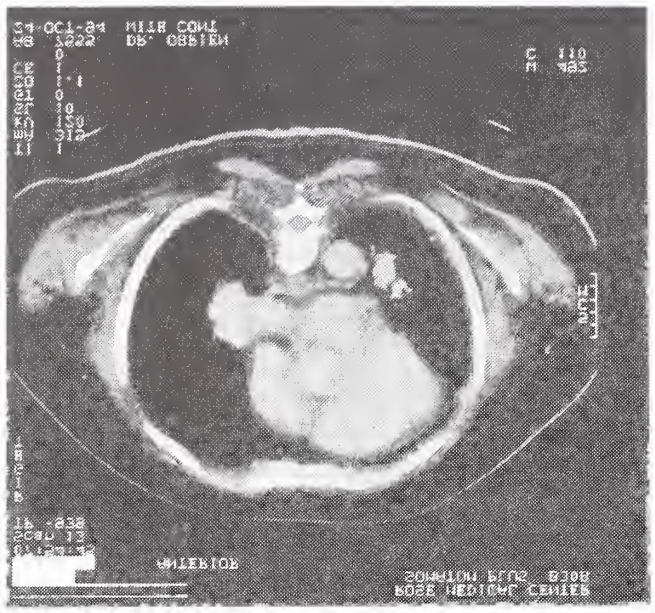

Figure 3: Contrast-enhanced Chest CT soft-tissue views of same 61 year old subject confirming the vascular nature of the mass, arrow.

and the medical literature.[2-9] At its core, these patients are characterized by a low minute ventilation which results in hypercapnea and consequent hypoxia. The hypoxia, in turn, is the stimulus for polycythemia, which is seen in this patient who had a hematocrit of 65%, and secondary pulmonary hypertension.[10,11] Most often these patients also demonstrate obstructive sleep apnea.[8,12,13]

The PA chest radiograph is remarkable for prominent, bilateral lower zone interstitial lung markings and what appears to be a right-sided pulmonary mass (figures 1, 2). Initially, this was interpreted as being suspicious for a pulmonary neoplasm with lymphangitic spread of tumor. However, on closer inspection, the mass has very smooth lateral and medial borders and seems contiguous with the right hilum. In addition, the left hilum is also prominent, and both the left descending pulmonary artery and right pulmonary artery are markedly enlarged suggesting the presence of pulmonary hypertension and raising the possibility that the right-sided mass is in fact not a neoplasm but a markedly enlarged right descending pulmonary artery. The exaggerated interstitial lung markings seen on PA view are not seen in the lateral projection and are likely due to the superimposition of an obese chest over the lower lung zones. Both the vascular nature of the mass and the absence of interstitial lung markings are confirmed by chest CT (figure 3)

Arterial blood gas analysis is critical in making the diagnosis of hypoventilation as the etiology of this patient's hypoxia. The primary disorder here is a simple primary chronic respiratory acidosis ($PaCO_2$ = 58 Torr) with normal metabolic compensation. The PaO_2 is critically low. The $AaPO_2$ gradient calculated from the alveolar gas equation (PB = 630 Torr in Denver), however, is a normal 15.5 Torr.[1] It would be unusual for either COPD, an asthma exacerbation or a pulmonary embolism not to produce an elevated $AaPO_2$ gradient. Thus, the etiology of this subject's hypoxia is likely due to hypoventilation, not to any intrinsic lung disease. At sea level (i.e., Texas) with a barometric pressure of 760 Torr one this individual would plausibly have a PaO_2 of 62 Torr. The moderate elevation of Denver exacerbated his hypoxia.

The clinical association of extreme obesity, somnolence, polycythemia and hypoventilation ... was named in reference to the "fat and red-faced boy in a state of somnolence" described in Dickens' novel, The Pickwick Papers.

There are several therapeutic options in such patients. Many benefit from nocturnal nasal CPAP therapy or tracheostomy.[13,14] Another subset will continue to hypoventilate despite adequate treatment of sleep- disordered breathing, indicating a likely central mechanism of respiratory drive dysfunction.[14] Some subjects respond dramatically to weight reduction and, thus, there may be a component of dysfunction due directly to the mechanical factors of obesity. Pulmonary function studies in such obese patients will demonstrate a mild restrictive pattern of dysfunction with a normal diffusing capacity.[15] Finally, as in obstructive sleep apnea syndromes it is important to eliminate other causes of respiratory drive suppression (narcotic, benzodiazepine and alcohol use or metabolic disturbances such as hypothyroidism).[16] Although researchers know little about the physiologic mechanisms underlying this interesting syndrome, clinicians should recognize it, because effective management strategies exist.[10, 12-14, 17, 18] The patient, treated acutely with phlebotomy and supplemental oxygen, has since done well with nocturnal nasal CPAP and continuous supplemental oxygen.

Summary

Dyspnea and cyanosis are common presenting manifestations of cardiopulmonary disease. When these findings occur in a cigarette smoker with an apparent pulmonary masss on chest radiograph, the diferential diagnosis rapidly narrows to a short list of possibilities that include pulmonary neoplasm, pulmonary infection and pulmonary infarction. Pulmonary hypertension with pulmonary arterial enlargement and hypoxia secondary to alveolar hypoventilation should also, however, be included as a diagnostic possibility in the appropriate setting because the evaluation and treatment of this entity may differ markedly.

References

1. Morris A, Kanner R, Crapo R, Gardner R. Clinical pulmonary function testing: a manual of uniform laboratory procedures. (2nd ed.) Salt Lake City: Intermountain Thoracic Society, 1984.
2. Burwell CS, Robin ED, Whaley RD, Bickelmann AG. Extreme obesity associated with alveolar hypoventilation - A pickwickian syndrome. *Am J Med* 1956;811:811-818.

3. Homma T, Hasegawa S. [Obesity hypoventilation syndrome, Pickwick syndrome]. *Nippon Rinsho* 1994;4:514-7.
4. Addington WW, Pfeffer SH, Gaensler EA. Obesity and alveolar hypoventilation. *Respiration* 1969;26: 214-25.
5. Findley LJ. The close but mysterious ties between obstructive sleep apnea and the obesity-hypoventilation syndrome [editorial]. *Chest* 1987;92:772-3.
6. Glauser FL, Fairman RP, Bechard D. The causes and evaluation of chronic hypercapnea. *Chest* 1987;91:755-9.
7. Luce JM. Respiratory complications of obesity. Chest 1980;78:626-31.
8. Morgan EJ, Zwillich CW. The obesity-hypoventilation syndrome. *West J Med* 1978;129:387-93.
9. Reece R. Cyanosis, polycythemia, and sudden death in a 42-year-old man. *Minn Med* 1967;50:1241-6.
10. Kuhlo W, Doll E. Pulmonary hypertension and the effect of tracheotomy in a case of Pickwickian syndrome. *Bull Physiopathol Respir* 1972;8:1205-16.
11. Hasleton PS, Heath D, Brewer DB. Hypertensive pulmonary vascular disease in states of chronic hypoxia. *J Pathol Bacteriol* 1968;95:431-40.
12. Rochester DF, Enson Y. Current concepts in the pathogenesis of the obesity-hypoventilation syndrome. Mechanical and circulatory factors. *Am J Med* 1974;57:402-20.
13. Sullivan CE, Berthon-Jones M, Issa FG. Remission of severe obesity-hypoventilation syndrome after short-term treatment during sleep with nasal continuous positive airway pressure. *Am Rev Respir Dis* 1983;128:177-81.
14. Rappaport DM, Garay SM, Epstein H, Goldring RM. Hypercapnea in the obstructive sleep apnea syndrome. *Chest* 1986;89:627-635.
15. Reichel G. Lung volumes, mechanics of breathing and changes in arterial blood gases in obese patients and in Pickwickian syndrome. *Bull Physiopathol Respir* 1972;8:1011-20.
16. Kooiker JC. Myxedema coma and hypoventilation. *Postgrad Med* 1972;51:162-6.
17. Piper AJ, Sullivan CE. Effects of short-term NIPPV in the treatment of patients with severe obstructive sleep apnea and hypercapnia. *Chest* 1994;105:434-40.
18. Lyons HA, Huang CT. Therapeutic use of progesterone in alveolar hypoventilation associated with obesity. *Am J Med* 1968;44:881-8.

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Ernest Hemingway and Sir William Osler

Roger Pearson, PhD

Much of what Ernest Hemingway wrote, as fiction, he lived. Born and raised in Oak Park, Illinois, Ernest Hemingway saw his father, Dr. Clarence Edmonds Hemingway, practice general medicine out of his home. Hemingway's uncle, Willoughby Hemingway, was also a physician, serving for many years as a missionary surgeon in Shansi Province, China. By the time Ernest was in the sixth grade there had been considerable discussion that he, too, would follow the medical career path of his father and his uncle. The father, encouraging such aspirations, sent Ernest a postcard from St. Mary's Hospital at the Mayo Clinic in Rochester, Minnesota, where he had been studying obstetrics:

October 10, 1910

> My dear Ernest: Here is a picture of the world's surgical headquarters. Your dad is having an excellent trip, it will be only a few years before you and Papa will be visiting clinics together. Much love to all, lovingly your father, C. E. Hemingway, MD.[1]

However, upon graduating from high school, Ernest Hemingway headed for an entry level position as a reporter for the Kansas City *Star* for six months, before joining the American Field Service to drive an ambulance in Italy. On July 8, 1918, Hemingway was wounded in the legs at Fossalta. With the aid of a cane, he limped off an ocean liner in New York City on January 21, 1919, and returned to his home in Oak Park to recuperate.

Given his home life, his service in the American Field Service, and his wounds, it is not surprising that a number of doctors appear in Hemingway's early fiction. In his initial collection of short stories, *In Our Time,* the first three stories feature doctors: "On the Quai at Smyrna," "Indian Camp," and "The Doctor and the Doctor's Wife." A doctor also appears prominently further on in the collection in "A Natural History of the Dead." Hemingway's war service and wounding is the basis for his novel, *Farewell to Arms* - no less than seven doctors appear in this work. Yet, surprisingly, a review of the literature on Ernest Hemingway, cross referencing "doctor," "medicine," or "William Osler," re-

veals not a single reference to the topic as it applies to Hemingway alone. Certainly, having a physician-father who made his practice in the family home, a father whom he admired and with whom he spent many hours hunting and fishing during summers in Michigan, had to have influenced Hemingway's fiction.

In 1980 a Hemingway scholar, Michael Reynolds, published a literary biography of Ernest Hemingway, *Hemingway's Reading, 1910-1940.* Indexed in this book is the name of Sir William Osler. The entry reads:

> 1620. Osler, Sir William. *A Way of Life,* (1914).
> SOURCE: KW55
> COMMENT: Philosophy[2]

In Reynolds' "Inventory" regarding *A Way of Life,* the source of his reference is given as "KW55" —— Key West. But in Reynolds' "User's Guide" he issues a bit of a disclaimer concerning the source "KW55."

> All my sources are reliable; however, the KW55 must be qualified. Any book with KW55 as its only source was probably in the Key West library in 1940 when Hemingway packed for Cuba. He may have left it there for a number of reasons. Perhaps he had read it and had no further use for it. Or it may have been a book of Pauline's which he had never read.[3]

In 1940 Hemingway was being sued for divorce for reasons of desertion by Pauline Pfeiffer. He left Key West for Havana, shipping his library in 45 carefully-inventoried crates. Reynolds appears to have mistaken *A Way of Life* for a "book." It actually is an essay, a speech, delivered to the Yale medical students in 1914 and published as a holograph. Judging its title, Reynolds lists the content of *A Way of Life* as "Philosophy." The conclusion here is that Reynolds did not recognize the name of Sir William Osler; so, Sir William Osler and *A Way of Life* are but a name and a title left behind in Key West — and forgotten, but not by Ernest Hemingway.

There are also indexed 11 entries under the rubric of "Medicine" in *Hemingway's Readings 1910-1940.* One entry is:

> 102. Journal of the American Medical Association 1919.
> SOURCE: ATH[4]

The source, "ATH," represents *At the Hemingways,* a memoir by Marcelline Hemingway Sanford, Ernest's older sister. This is what Marcelline says about her brother's recuperation at the Hemingway home: "Often Ernie was in real pain, but usually by the time he came downstairs he was quite cheerful. He wrote lots of letters to Italy, and he read for hours at a time in bed. He read everything around the house — all the books, all the magazines, even the A.M.A. Journals from Dad's office downstairs."[5]

One of the A.M.A. Journals Hemingway read was April 26: volume 72, number 17, which excerpted from the *Lancet,* "Influenza Pneumonia with Hemorrhagic Spinal Meningitis:"

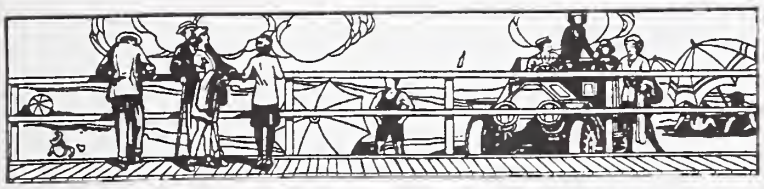
> Osler cites a case of influenza pneumonia with bilateral rigidity. The neck was so rigid that the patient could not lift the head from the pillow. The spine was arched, the muscles strongly contracted. Both upper limbs were in toxic spasm, the arms more than the forearms; he could extend and flex the fingers; he could not move the arms ... Both legs were rigid.[6]

In "On the Quai at Smyrna" a British medical officer describes the carnage in the wake of the Greek evacuation of Smyrna in Western Turkey after World War I. He is asked to look at a woman on the quai. "So I had a look at her and just then she died and went absolutely stiff. Her legs drew up from the waist and went quite rigid. She was quite dead and absolutely rigid. I told a medical chap about it and he told me it was impossible.[7] Hemingway used this volume of the A.M.A. Journal as a source for a number of other incidents, so this specific reference to Osler cannot be dismissed as a coincidence.

As a practicing physician, Dr. Clarence Hemingway would have had at the ready Sir William Osler's textbook, *The Principles and Practice of Medicine,* considered the bible at the time. It is also safe to assume that Hemingway's father had a copy of *Aequanimitas,* a collection of Osler's speeches, published in 1904. Osler's textbook and *Aequanimitas* were given to newly minted doctors as graduation gifts. Still, the evidence that Ernest Hemingway drew from Osler's writings, particularly *Aequanimitas,* is, arguably, circumstantial, that is until we look at the doctors in the short stories of *In Our Time..*

In "Indian Camp" Dr. Adams is called to assist an Indian woman who is suffering through a breech birth. He has brought his son, Nick, along, together with the boy's uncle. The woman is screaming in agony, so much so that the men of the camp have moved up the road. Nick's father, the studied professional, all but admonishes Nick when Nick asks: "Daddy, can't you give her something to make her stop screaming?" The father's response is cool, steady, perhaps callous: "No, I haven't any anaesthetic. ...But her screams are not important. I don't hear them because they are not important."[8]

Critics have generally considered the father's response as typical Hemingway stoicism. James Cowan writes in *Literature and Medicine*: "Dr. Adams does not allow sympathy for the patient's suffering to intrude upon or mar the competence of his cool professional practice."[9] Cowan, however, sees the contrast of Dr. Adams' professionalism with Uncle George's anger upon being bitten by the woman, "Damn Squaw bitch." Whatever the contrast, Cowan's interpretation of Dr. Adams' professional behavior is typical. But, by what standard should a doctor's professionalism be measured? The answer is found in Sir William Osler's Valedictory address to the 1889 graduating class of the University of Pennsylvania's Medical School:



In the first place, in the physician or surgeon no quality takes rank with imperturbability. ... Imperturbability means coolness and presence of mind under all circumstances, calmness amid storm, clearness of judgment in moments of grave peril, immobility, impassiveness, or, to use an old expressive word, phlegm.[10]

Further,

The first essential is to have your nerves well in hand. Even under the most serious circumstances, the physician or surgeon who allows "his outward action to demonstrate the native act and figure of his heart in complement extern," who shows in his face the slightest alteration, expressive of anxiety or fear, has not his medullary centers under the highest control, and is liable to disaster at any moment.[11]

And again,

Far be it from me to urge you to quench on all occasions the blushes of ingenuous shame, but in dealing with your patients emergencies demanding these should certainly not arise, and at other times an inscrutable face may prove a fortune.[12]

So, when Nick's father says the Indian woman's screams "are not important," he is adhering to the code of professional behavior expected of a turn-of-the-century physician - - *Aequanimitas.* "I don't hear them because they are not important" — words that could just have easily been spoken by Sir William Osler.

Nick Adams' father in "The Doctor and the Doctor's Wife" adopts an attitude of imperturbability, when Dick Boulton tries to provoke him into a fight to avoid working off a medical bill for the doctor having treated his wife for pneumonia. The father backs down from the younger, stronger, Boulton's challenge and returns to the cabin, where Dr. Adams is questioned and lectured by his wife. The wife's pacifism (she is a Christian Scientist) is a stark contrast to Boulton's penchant for violence, and both sorely try the forebearance of the doctor. The doctor sublimates his anger by loading and unloading his shot gun.[13]

In "A Natural History of the Dead" a surgeon fails to yield to the demands of stretcher bearers to move a mortally wounded soldier from a cave that is used as a mortuary, to a place for the wounded. The doctor has determined that the soldier will shortly die. Like the doctor in "Indian Camp," the surgeon will not let the moaning soldier and the pleas of the stretcher bearers sway his judgment.

> "No. No. No!" said the doctor, who was busy. "What's the matter? Are you afraid of him?"
> "We don't like to hear him in there with the dead."
> "Don't listen to him. If you take him out of there you will have to carry him right back in."

A wounded artillery officer suggests that the doctor overdose the man.

> "Do you think that is the only use I have for morphine? Would you like me to have to operate without morphine?"

The officer offers to shoot the man: "I am a humane man. I will not let him suffer." The surgeon is unmoved: "My business is to care for the wounded, not to kill them."[14]

No one has considered Hemingway's doctors as an extension of Sir William Osler. More surprising, no one has seen the Hemingway code hero as the literary extension of a code of conduct enunciated by Sir William Osler in *A Way of Life;* yet we know that Hemingway possessed a copy of *A Way of Life* in 1940. The title, *In Our Time,* is taken from the Anglican Book of Common Prayer: "Give us peace, O Lord, in our time." Rather than peace, the Hemingway hero finds himself in an antithetical world — a world of violence. For Hemingway, all stories end in loss; all stories end in death. Life is like the bullfight — there are no ties. The violence assumes many forms: a violent death (what Hemingway terms an animal fate), the resulting fear, nervousness, and sense of loss. Come "Big Two-Hearted River: Part I and II," there have been too many failures. Nick has learned that there is no "peace in our time." So, the Hemingway hero adopts a modus vivendi, a code, "a way of life," to cope with this reality, a behavior marked by form, ritual, and an emotional discipline. The code hero stays within a proscribed territory that he can control, lest he suffer the consequences of overreaching.

What Sir William Osler had to say to Yale medical students, pressured by study and, later, the practice of medicine, Hemingway would find to be the code for his hero.

In "The End of Something" Nick has fallen out of love with Marjorie: "It isn't fun any more."[15] The failure is not biological, as in "Indian Camp," or in other people, as in "The Doctor and the Doctor's Wife." The failure is within Nick. Later, Nick and Bill discuss the event (in "The Three-Day Blow"). Nick says, "I oughtn't to talk about it." Bill's advice is a step further: "You don' t want to think about it." Perhaps Nick will take himself into town on Saturday night. Nick will take the problem of Marjorie one day at a time. Saturday could be a new start. "Nothing is ever lost."[16]

But the failings in life threaten the Hemingway hero more than the breaking off of a summer romance. Nick

Adams returns to upstate Michigan in "Big Two-Hearted River: Part I and II" to restore himself emotionally. The Hemingway hero's initiation into life's realities has left him scarred. Particularly, there has been the war and the wound. The scene is symbolic. The landscape around Seney is a wasteland, scorched by a forest fire, leaving but a few foundations of the town and a blackened, treeless plain that leads away to the Big Two-Hearted River: "He felt he had left everything behind, the need for thinking, the need to write, other needs. It was all back of him." What Nick does is ritual: watching the trout holding steady in the current under the trestle; adjusting his backpack and walking along the road that parallels the railroad tracks, fishing rod case in hand; setting up camp and making dinner; and, finally, lying down to sleep for the night. "His mind was starting to work. He knew he could choke it because he knew he was tired enough."[17]

Nick is tired — and happy. What had brought him to Seney, fishing the Big Two-Hearted River, awaits him in the morning. And the next morning Nick gathers grasshoppers for bait and wades into the river to fish the trout. Nick is in control. However, later, Nick comes to a place where the river narrows into a swamp.

> Nick did not want to go in there now. He felt a reaction against wading with the water deepening up under his armpits, to hook big trout in places impossible to land them ... in the fast deep water, in the half light, the fishing would be tragic. In the swamp fishing was a tragic adventure. Nick did not want it. He did not want to go down stream any further today.

The swamp, with its complications, its tragic consequences, is beyond Nick's control; so Nick takes out his knife and cleans the fish he has caught. Then he walks ashore and climbs the hill to the high ground, back to camp. "He was going back to camp. He looked back. The river just showed through the trees. There were plenty of days coming when he could fish the swamp."[18]

Osler delivered his speech, *A Way of Life* , to the students at Yale, offering them advice on how to cope with the pressures of the study and practice of medicine: "Now the way of life that I preach is a habit to be acquired gradually by long and steady repetition. It is the practice of living for the day only. And for the day's work, *life in day-tight compartments* [italics Osler].[19]

Osler tells the following anecdote:

> I stood on the bridge of one of the great liners, ploughing the ocean at 25 knots. "She is alive," said my companion, "in every plate; a huge monster with brain and nerves, and immense stomach, a wonderful heart and lungs, and a splendid system of locomotion. "Just at that moment a signal sounded, and all over the ship the watertight compartments were closed. "Our chief factor of safety," said the Captain. "In spite of the Titanic," I said. "Yes," he replied, "in spite of the Titanic."

Osler adds:

> Now each of you is a much more marvelous organization than the great liner, and bound on a longer voyage. What I urge is that you so learn to control the machinery as to live with "day-tight compartments" as the most certain way to ensure safety on the voyage. Get on the bridge, and see that at least the great bulkheads are in working order. Touch a button and hear, at every level of your life, the iron doors shutting out the past — the dead yesterdays. Touch another and shut off, with metal curtain, the future — the unborn tomorrows. Then you are safe — safe for today.[20]

This is the code: "the habit of a Life of Day-Tight Compartments." Scarred by the past, fearful of the future, the Hemingway hero becomes a sensation seeker, living from day-to-day in compartments that allow him to function within a proscribed territory: his emotions in relation to the events that surround him. Words like "carefully," "surely," "truly," and "properly" are the vocabulary of the code. So are "fine," "clean," and "straight," words that evoke an emotional discipline. Osler says: "Do not be discouraged — like every other habit, the acquisition takes time, and the way is one you must find for yourselves."[21] From Nick Adams (*In Our Time*) through Santiago (*The Old Man in the Sea)*, the Hemingway hero finds the perfected code.

At his best the Hemingway hero is stoic, controlled, noble. "They truly beat me." Santiago simply "went out too far."[22] At his worst the hero is all swagger, self-pity, parody. "Finally he did get hit properly and for good." Colonel Cantwell had "a good regiment. ... You might even say it was a beautiful regiment until I destroyed it under other people's orders."[23] What Sir William Osler advised Yale medical students, pressured by study and, later, the practice of medicine, Hemingway would find to be the code for his hero.

Chapter VI of *In Our Time* introduces the theme of the separate peace, disengagement. Shutting off is the term Osler uses.

"Senta Rinaldi; Senta. You and me we've made a separate peace."[24]

Frederic Henry (*A Farewell to Arms*) faced with a charge of desertion and a firing squad during the retreat from Caporetto, signs his separate peace.:

> I was through. I wished them all the luck. There were the good ones, and the brave ones, and the calm ones and the sensible ones, and they deserved it. But it was not my show any more and I wished this bloody train would get to Mestre and I would eat and stop thinking. I would have to stop.

For all purposes, Frederic Henry is dead, dead by a firing squad, drowning, or, from wounds, whatever way the Italian authorities decide to report him dead. Frederic wonders about the priest in the officer's mess and his roommate, Rinaldi. "Well, I would never see him now. I would never see any of them now. That life was over. ..." Then in a series

of sentence fragments and simple sentences Frederic shuts out his past and any sense of regret, thinking only of the immediate.

> I was not made to think. I was made to eat. My God, yes. Eat and drink and sleep with Catherine. To-night maybe. No that was impossible. But tomorrow night, and a good meal and sheets and never going away again except together. Probablyhave to go damned quickly. She would go. When would we go? That was something to think about. It was getting dark. I lay and thought where we would go.[25]

The code hero will try not to think anymore, for that will bring back the past, the old grievance, as Jake Barnes calls it in *The Sun Also Rises.* Osler has something to say about dwelling on the past:

> Many a man is handicapped in his course by a cursed combination of retro- and intro-spection, the mistakes of yesterday paralyzing the efforts of to-day, the worries of the past hugged to his destruction, and the worm Regret allowed to canker the very heart of his life.[26]

Hemingway read Osler's entry, "Influenza Pneumonia with Hemorrhagic Spinal Meningitis," in the AMA Journal; and Hemingway used it in, "On the Quai at Smyrna." That Hemingway read and was influenced by Osler's *Aequanimitas* is not documented. However, what is documented is that Hemingway in1940 had a copy of *A Way of Life* - perhaps through his father. It is likely that Dr. Hemingway possessed *Aequanimitas*, as well. We are told that Ernest Hemingway read everything around the house in that spring of 1919. If so, the documentation that Hemingway read and was influenced by the writings of Sir William Osler should appear in Hemingway's fiction. The code of conduct of Hemingway's doctors is the code of conduct that Osler set down in *Aequanimitas.* The code of conduct in the Hemingway hero is but a natural extension of *Aequanimitas*, "imperturbability," that is, "to cultivate the habit of a life of Day-Tight Compartments," "shutting out the past," to live surely, truly, and carefully in the present. "Shut off, with metal curtain, the future — the unborn tomorrow. Then you are safe — safe for to-day."

Sir William Osler's legacy in medicine is an enduring one. That he influenced Ernest Hemingway in the formation of the defining themes of his fiction, the code hero and the separate peace, only adds to his stature.

References

1. Baker C. *Ernest Hemingway: A Life Story.* NY: Bantam Books. 1970; 20.
2. Reynolds M. *Hemingway's Reading, 1910-1940.* NJ: Princeton University Press, 1981;166.
3. *Hemingway's Reading, 1910-1940*; 75.
4. *Hemingway's Reading, 1910-1940*; 82.
5. Sanford M. *At The Hemingways: A Family Portrait.* London: Putnam Press. 1963; 179.
6. Osler W. Influenza Pneumonia with Hemorrhagic Spinal Meningitis. *JAMA* 1919;72, 17:1255.
7. Hemingway E. On the Quai at Smyrna. *In Our Time.* NY: Charles Scribner's Sons1958; 10.
8. Indian Camp. *In Our Time;* 17.
9. Cowan J. The *Pharmakos* Figure in Modern American Stories of Physicians and Patients. *Literature in Medicine.* Baltimore: Johns Hopkins University Press, 1987; 104.
10. Osler W. *Aequanimitas.* Third Edition. Philaa: The Blakiston Co. 1943;3-4.
11. *Aequanimitas;* 4.
12. *Aequanimitas;* 4-5.
13. The Doctor and the Doctor's Wife. In Our Time; 25-31.
14. Hemingway E. A Natural History of the Dead. *The Short Stories of Ernest Hemingway.* NY: Charles Scribner's Sons, 1938; 447, 448.
15. The End of Something. *In Our Time;* 40.
16. The Three Day Blow. *In Our Time;* 57-60.
17. Big Two-Hearted River: Part I. *In Our Time;* 179, 191.
18. Big Two-Hearted River: Part II. *In Our Time;* 211-212. Note: Philip Young saw this scene as a prediliction for suicide on the part of Hemingway: *Ernest Hemingway.* NY: Rinehart 1952 and *Ernest Hemingway: A Reconsideration.* University Park and London: Pennsylvania State Univ. Press.
19. Osler W. *A Way of Life.* Baltimore: The Remington-Putnam Book Co. 1932; 17.
20. *A Way of Life;* 23.
21. *A Way of Life;* 19.
22. Hemingway E. *The Old Man and the Sea.* NY: Charles Scribner's Sons. 1952; 124, 120.
23. Hemingway E. *Across the River and Into the Trees.* NY: Charles Scribner's Sons1950; 33,242.
24. Chapter VI. In Our Time.
25. Hemingway E. *A Farewell to Arms.* NY: Charles Scribner's Sons. 1957; 232-233.
26. *A Way of Life*; 26.

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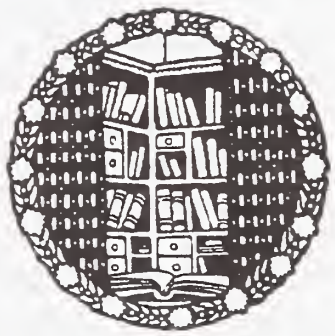

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THE CREATIVE CLINICIAN:
CASE OF THE MONTH

The practice of medicine is an art, not a trade; a calling, not a business ..." – WILLIAM OSLER, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

Pulmonary Actinomycosis: A Cause of Adult Respiratory Distress Syndrome

Robert S. Crausman, MMS, MD, Scott Wilson, MD, and Philmon T. Marvell, II, MD

THE PATIENT

This 48 year-old white male was admitted with dyspnea that had been developing over 3-4 days.

He had smoked one pack/day for 20 years and drunk one 6-pack of beer/ day for 30 years. He denied chest pain, night sweats, fever, cough, nausea, vomiting, hemoptysis or hematemesis, but had lost 10 pounds over the past 2 months. He had never been hospitalized, had no known exposure to tuberculosis, took no medications, and had no known drug allergies.

On physical examination, he was cathectic, anxious and in mild respiratory distress. His temperature was 99 degrees, heart rate 126 beats per minute, respiratory rate 32 per minute. The head and neck exam revealed poor dentition. The chest exam revealed distant breath sounds without wheezes. The cardiac exam was normal; the extremities were without cyanosis, clubbing or edema. The neurologic and cutaneous examinations were normal.

Laboratory data showed a white blood cell count of 14.3, hemoglobin 15.7 grams per deciliter and normal platelets. Electrolytes, BUN, creatinine and glucose were normal. A 12-lead EKG demonstrated a sinus tachycardia with normal intervals, normal axis and no evidence of ischemia. A chest x-ray (Figure 1) showed a 3 cm pulmonary nodule in the superior segment of the left lower lobe with evidence of cavitation, confirmed by chest CT (Figure 2).

An arterial blood gas on room air showed a pH 7.65, PCO2 18 Torr, PAO_2 79 Torr, $AaPO_2$ gradient of 50 Torr. A ventilation/perfusion lung scan was non-diagnostic; a lower extremity ultrasound was negative for venous thrombosis; and a pulmonary angiogram was normal.

INITIAL, AND SUBSEQUENT, DIAGNOSIS

The initial diagnosis was pneumonia; the patient was placed on IV antibiotics (pipricillin and gentamycin). Three sputum samples for acid fast bacillia were negative. A needle biopsy of the cavitary lesion was performed under CT guidance and yielded only necrotic tissue. The patient's clinical course worsened: he developed increased respiratory distress and a diffuse 5 lobar pulmonary infiltrate compatible with acute lung injury/early ARDS.

The patient underwent an open lung biopsy for diagnosis of the pneumonic process. Histologic examination showed early ARDS and evident sulfur granules highly suggestive of actinomycosis (Figure 3,4). Special stains for acid-fast bacteria were negative.

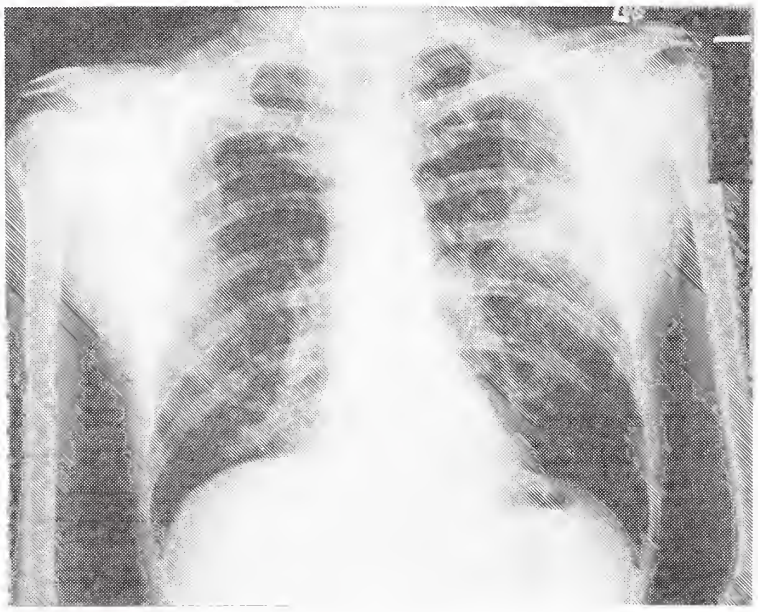

Figure 1a.

Figure 1b.

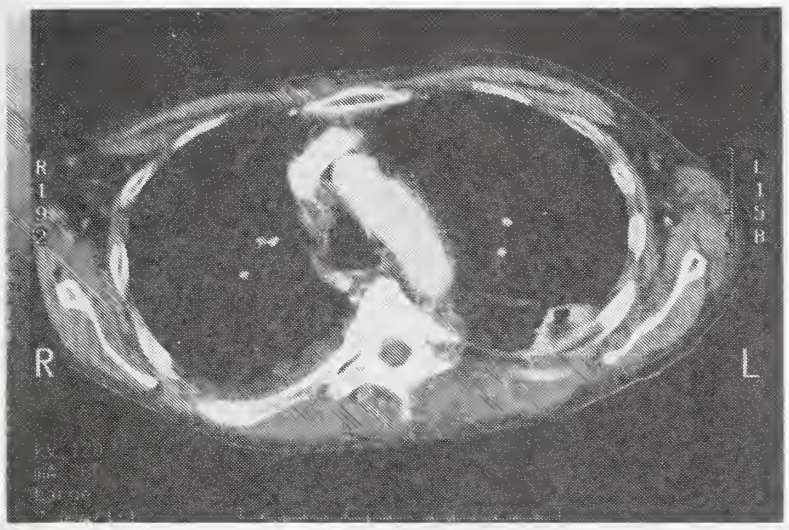

Figure 2.

A Clue: Poor Teeth

Pulmonary actinomycosis is most often an indolent infection that affects males with poor dentition[1,2] - known to cause focal or diffuse pulmonary infiltrates, mass-like lesions, cavitary nodules and pleural effusions. It has been described as a cause of usual interstitial pneumonitis and pulmonary fibrosis. Intrathoracic extension into mediastinal structures and through the chest wall occasionally occurs. It has been confused with bronchogenic cancer, Wegener's granulomatosis,[1] fungal disease, and tuberculosis.

Diagnosis usually rests upon the demonstration of the causative organism in either tissue or culture fluid. However, the diagnosis can be elusive. Successful culture requires use of thioglycolate media; tissue diagnosis is often required. Sulfur granules in either expectorated material or tissue are highly suggestive.[2,3]

ARDS

For this patient with ARDS, the only predisposing factor was pulmonary infection with actinomycosis. The diverse potential precipants of ARDS often involve severe inflammatory processes (sepsis syndrome or traumatic injury), but occasionally no etiology is found. The pathophysiologic mechanisms responsible for the development of lung injury are unkown, but likely involve neutrophil dependent tissue destruction.[4-6]

Acute lung injury and ARDS have been linked to numerous bacterial, fungal and protozoal infections. In an immunosuppressed population *aspergillus* and *pneumocystis carinae* pneumonia frequently precipitate ARDS. It has also been linked to pulmonary nocardiosis.[7] *Actinomycosis israelii*, the causative agent of human actinomycosis, shares common morphologic characteristics with many fungi and nocardia and is classified microbiologically as a bacterium. It typically produces indolent granulomatous infection and may go undetected for a long time. A disseminated form of the disease is described.[8]

Although the literature has not linked acute lung injury and adult respiratory distress syndrome to pulmonary actinomycosis, this patient developed ARDS as a consequence of pulmonary actinomycosis.

Treatment

The patient's antibiotics were changed to IV Imipenem.

He improved and was discharged on a six-month course of oral penicillin. In follow-up he has been well, with complete resolution of his pulmonary infiltrates.

References

1. Smith R, Heaton CL. Actinomycosis presenting as Wegener's granulomatosis. *JAMA* 1978;240(3):247-8.
2. Schaal KP, Lee HJ. Actinomycete infections in humans - a review. *Gene* 1992;115(1-2):201-11.
3. Frank P, Stricland B. Pulmonary actinomycosis. *Br J Radiol* 1974;47(559):373-8.
4. Petty TL. The actue respiratory distress syndrome. Historic Perseepctive. *Chest* 1994;105(3 Suppl):44S-47S.
5. Petty TL, Ashbaugh DG. The adult respiratory distress syndrome. Clinical features, factors influencing prognosis and principles of management. *Chest* 1971;60(3):233-9.
6. Petty TL. Acute respiratory distress syndrome (ARDS). *Dis Mon* 1990;36(1):1-58.
7. Schulman LL, Enson Y. Nocardia pneumonitis and the adult respiratory distress syndrome. *Am J Med Sci* 1987;293(5):315-9.
8. Varkey B, Landis F, Tang T, Rose HD. Thoracic actinomycosis. Dissemination to skin, subcutaneous tissue and muscle. *Arch Intern Med* 1974;134(4):689-93.

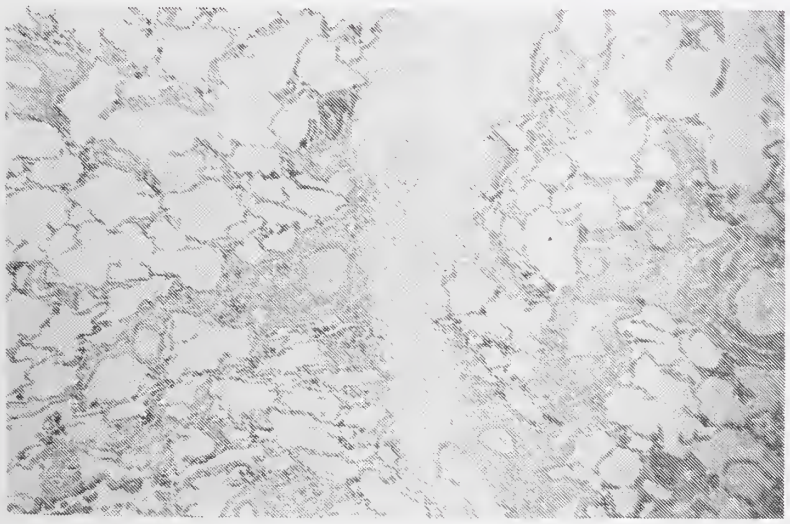

Figure 3.

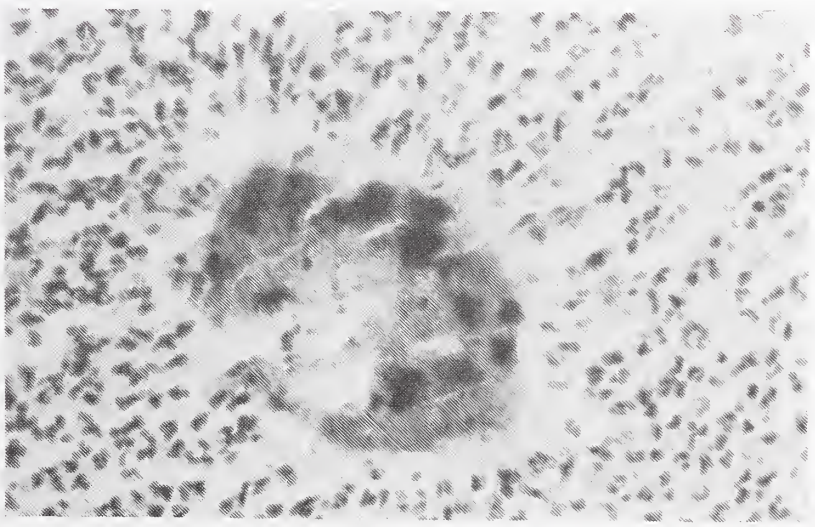

Figure 4.

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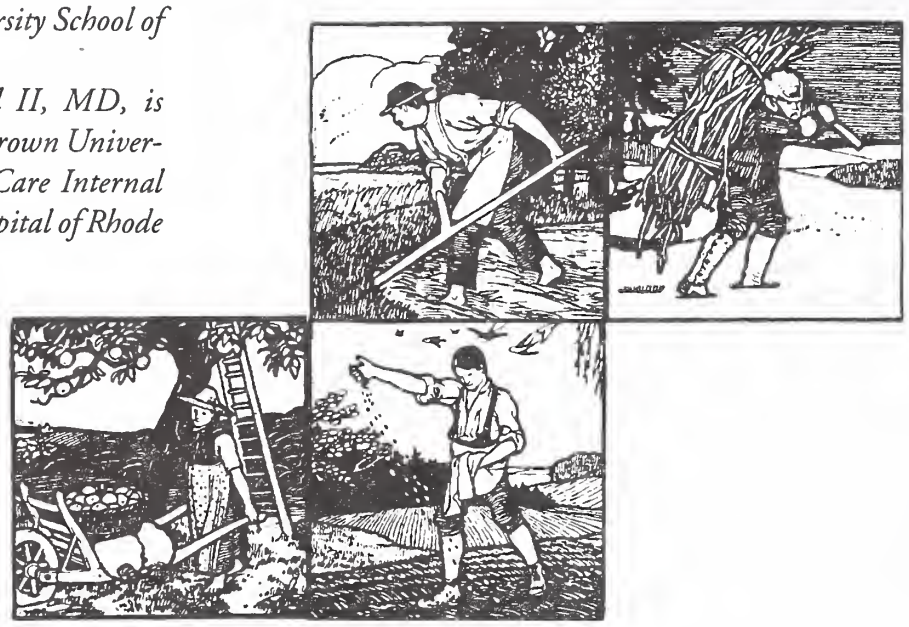

Announcement

NEEDED: MEDICAL SUPPLIES FOR GUATEMALA

The Brown University Chapter of Physicians for Human Rights (PHR) is organizing a medical supplies drive for a community health clinic in San Lucas Toliman, an agricultural community in the Guatemalan highlands. Many Brown University faculty and medical students have traveled regularly to this clinic to provide health care services and work at the Nutrition Center providing counseling and nutritional information.

Those who have returned from Guatemala frequently express the need the community has for basic medical supplies and other health care related items. We plan to collect supplies over the next few months and send them to San Lucas Toliman during the summer of 1997, but as this is an ongoing project, donations will be accepted at any time. Supplies needed are: otoscopes (electric or battery powered), splints, knee braces, all types of pediatric medications in the powder form, Erythromycin tablets, IV poles, IV pumps, crutches, forceps (for deliveries), wheel chairs, newborn incubators, gurneys, suction machines (for newborns), and pulse oximeters. Other non-medical supplies needed are: a mechanical typewriter, goose neck lamps, floor polisher, and vacuum cleaner. Tax-deductible monetary donations are also welcomed in conjunction with the RI Central America Education Fund.

This is a rare opportunity for us, as medical students, to help improve the health status of individuals whose lives we may not be able to contribute to in any other way. Through your donation, you will help make this possible.Thank you.

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For questions, contact: Elizabeth Casiano (401) 863-5308 or Pooja Sarin (401) 861-9938

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Managed Care – Complaints and Regulations

Linda Johnson, MS, and Alison DeBlois, MS

The Rhode Island General Assembly has passed three acts relevant to managed care. These acts are designed to protect consumers and monitor the activity of health plans. In each of these laws, sections provide for patients and providers to submit complaints to the Rhode Island Department of Health when resolution has not been possible through other mechanisms. Analysis of the nature of these complaints provides a perspective on the issues that have arisen as our health care system has moved increasingly toward managed care.

The Health Maintenance Organization Act (R.I. General Law 24-41), the oldest of these laws (1983), governs only those risk-sharing health plans defined to be HMOs by the Department of Business Regulation (DBR). The six licensed HMOs in Rhode Island have a total enrollment of 361,291, not adjusted for duplicate coverage (Table 1). Together the DBR and the Rhode Island Department of Health (the Department) monitor HMO activity in Rhode Island. The Department reviews the quality, continuity, and adequacy of access of health care services to enrollees. Additionally, the Department maintains an ongoing monitoring system for HMOs that includes biennial reviews, resolution of complaints, and the review of quarterly reports.

A summary of the formal complaints received and managed by the Department under this legislation during 1996 appears in Table 2. These complaints are those which have not been resolved within the health plans. The majority of complaints received by the Department, from both enrollees and providers, involve access to care. An access complaint is filed when an enrollee or an enrollee's provider is not able to obtain covered health care services. For example, the provider network may not include a category of specialist, or there may be no providers of covered services within a reasonable distance of the enrollee. Given that HMOs generally use limited networks, particularly for ancillary and specialty services (e.g., radiology, pharmacy, laboratory, physician specialists), it is not surprising that these restrictions result in some complaints. The Department's role is to ensure that a HMO's provider network does not become so limited that enrollees cannot get the services they need.

The second managed care law was passed more recently and resulted from the increasing level of utilization review (UR) activity in Rhode Island. The Utilization Review of Health Care Services Act (R.I.G.L. 23-17.12) of 1994 gives the Department the authority to certify and monitor those organizations performing utilization review for Rhode Island residents. There are currently 68 certified UR companies in Rhode Island.

Table 1.

Reported Enrollment in Licensed Health Maintenance Organizations, by Type of Plan, Rhode Island, April 1997

Organization	Type of Plan: Commercial & Self-Insured	Medicare & Medicaid	Total
Aetna US Healthcare	4,255	0	4,255
Coordinated Health Partners (BlueCHIP)	22,178	7,352	29,530
Harvard Pilgrim Health Plan of New England	60,918	11,252	72,170
Neighborhood Health Plan of Rhode Island	13	25,123	25,136
United HealthCare of New England	179,200	51,000	230,200
Total*	266,564	94,727	361,291

*Not adjusted for duplicate coverage

Table 2.

Complaints to the Rhode Island Department of Health Regarding Health Maintenance Organizations, by Category, 1996

Category	Number	(Percent)
Non-covered benefit	6	(14%)
Access to care	31	(70%)
Quality of care	3	(7%)
Continuity of care	0	(0%)
Other	4	(9%)
Total	44	(100%)

Table 3.

Complaints to the Rhode Island Department of Health Regarding Utilization Review Companies, by Category, 1996

Category	Number	(Percent)
Mental Health and Substance Abuse		
Access to care	18	(58%)
Other	3	(10%)
Subtotal	21	(68%)
Medical-Surgical		
Access to care	9	(29%)
Other	1	(3%)
Subtotal	10	(32%)
Total	31	(100%)

When a UR company determines that a covered service is not medically necessary and denies payment, either prospectively or concurrently, it affords enrollees and/or their providers two levels of internal appeals as prescribed by law. These UR companies must also offer an objective review by an external appeals agency (designated by the Department) after the first two levels of appeal. As part of the continued certification of UR companies, the Department conducts a biennial review, monitors complaints, and requires submission of quarterly reports.

In 1996, the Department received 31 UR complaints (Table 3). Of these, 21 involved the denial of mental health or substance abuse services to enrollees; 18 of these 21 were for lack of access to services. This means the complainants, including enrollees and providers, were not able to obtain or furnish mental health and substance abuse services because the UR company was denying payment. Access issues were also the most common in the medical-surgical complaint category (9 out of 10), consistent with the pattern of HMO complaints received by the Department.

Quarterly reports submitted by the UR companies are reviewed by the Department to monitor trends in the number of denials and appeals. Table 4 presents a summary of these reports for 1996. Approximately 1% of the requests for covered services made on behalf of enrollees are denied payment. During the last two quarters, there were decreases in the percentages of denials that go to the first and second levels of appeal. Enrollees and/or their providers may have chosen not to appeal, since there is no evidence that certified UR companies were not offering the mandated appeals process. Overall, the quarterly reporting allows the Department to observe and investigate changes in the appeals process and gives the UR companies the opportunity to explain the changes. Because of differences in how UR companies report and manage complaints, the Department is unable to compare information across health plans and UR companies.

Table 4.

Summary Measures of Utilization Review Activities (Denials of Service, Appeals, and Overturned Denials), by Quarter, Rhode Island, 1996

Summary Measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Total number of requested services	56.213	74,585	73,271	53,864
Percentage of requested services denied	1.1%	1.0%	1.2%	1.1%
Of services denied, percentage appealed to first level	45%	47%	33%	26%
Of first level appeals, percentage overturned and paid	55%	46%	46%	44%
Of first level denials upheld, percentage appealed to second level	50%	34%	26%	17%
Of second level appeals, percentage overturned and paid	23%	27%	33%	38%
Of appeals to external level, percentage overturned and paid	not reported	50%	50%	68%

As managed health care grows in Rhode Island, so too do legislative efforts to protect consumers and providers. The third legislative effort is the Health Care Accessibility and Quality Assurance Act (R.I.G.L. 23-17.13), which took effect on January 1, 1997. Under this act the Department has the authority to certify all health plans operating in Rhode Island. Health plans are defined as entities that provide health care services to an enrolled population through the use of provider networks or have financial incentives in place for enrollees to use certain providers. The Department is currently implementing this act through the development of rules and regulations.

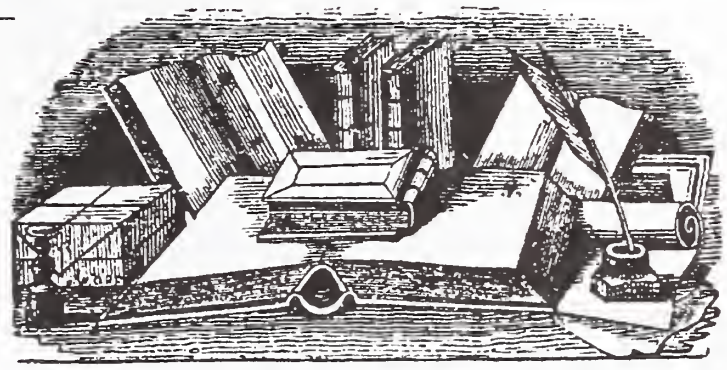
The primary purpose of this act is to specify the information health plans must disclose to enrollees and prospective enrollees. This information focuses on what enrollees need to know to

choose a health plan and to utilize the benefits provided by their plan. Disclosure will be on a form prescribed by the Department using standardized definitions. Enrollees will be able to compare one health plan to another and to decide which health plan best suits their needs. This law also requires health plans to credential providers, protect providers against "gag clauses", afford providers due process in contracting with health plans, and submit to the Department's monitoring of the quality, continuity and accessibility of covered health care services. The Department will also manage complaints and will require standardized reporting from all health plans, enabling the Department to compare data across health plans. Relative to other states, Rhode Island has taken a forceful and active role to protect and assist consumers as health plans turn increasingly to managed care.

Linda Johnson, MS, is Chief of Managed Care Regulation in the Division of Health Services Regulation.

Alison DeBlois, MS, is Health Policy Analyst in the Division of Health Services Regulation.

Letters to the Editor



[Re: Commentary on Bubonic Plague]

I offer a related experience in a different place in Tuscany.

San Gemiagnano is an ancient walled hill town between Florence and Sienna, probably Etruscan in origin. In the 14th century it was a trading center on the same political level and size as its neighbors. At that time its population was estimated at 4,000-5,000, similar to Sienna. In 1475 the plague visited San Gemiagnano. Within a few years its population was reduced to 500-600. It never recovered and has become frozen in time. Its current population is about 2,000. It maintains an ancient town square and church complete with pre-renaissance wall paintings.

The element that makes it particularly remarkable are its towers. In its golden age, it was the practice of powerful families to build towers on top of their warehouses, perhaps for defensive reasons but more likely as an indication of power and wealth. The towers are still there because after the plague wiped out the people, the community became insignificant from a trading and political point of view and so it was never attacked during the Condotiere wars between the northern Italian cities during the renaissance. It was essentially a hill top backwater.

Ten to fifteen towers still remain, 60-100 feet high. They are striking. For an American, particularly a New Yorker, as you approach San Gemiagnano from the road on the plain below it looks like lower Manhattan as seen from Staten Island or from the New Jersey Turnpike. It has been used as a backdrop for films about Tuscany/Northern Italy of the Merchant Ivory genera.

Also of interest is that the vineyards below the walls produce a particularly potable dry white wine named Vernaccia, or sometimes Vernaccia of San Gemiagnano. It is available in Rhode Island. The label frequently shows the towers.

San Gemiagnano is well worth noting for the impact of the plague on human destiny, and perhaps particularly for the impact of the plague on urban planning.

– **Herb Constantine, MD**
Providence, RI

[Re: Physician-Assisted Suicide]

Regarding the question of physician-assisted suicide: The American Medical Association has always firmly maintained that nobody shall interfere with the patient-physician relationship - no one, that is, except the AMA itself.

– **Hugo Taussig, MD**
Providence, RI

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PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Proposed Breast Cancer Screening Recommendations

Barbara Schepps, MD, and Joann M. Lindenmayer, DVM, MPH

Objective

The Rhode Island Department of Health assembled an Expert Panel on Cancer Screening to advise the Department on revising the State's current cancer control plan, published in 1989.[1] After reviewing the current screening recommendations of national organizations and the most recent pertinent literature, the Panel proposed a recommendation for breast cancer screening.

Methods

- Review current breast cancer screening recommendations of national organizations.
- Review the most recent literature pertinent to breast cancer screening.
- Discuss.
- Propose a breast cancer screening recommendation for the State's cancer control plan.
- Write a simple rationale for the proposed breast cancer screening recommendation.
- Invite comments on the proposed recommendation and rationale.

Current Breast Cancer Screening Recommendations

Organization	Recommendations
U.S. Preventive Services Task Force[2]	• Routine screening for breast cancer every 1-2 years, with mammography alone or mammography and annual clinical breast examination (CBE), is recommended for women aged 50-69. • There is insufficient evidence to recommend for or against routine mammography or CBE for women aged 40-49 or aged 70 and older, although recommendations for high-risk women aged 40-49 and healthy women aged 70 and older may be made on other grounds. • There is insufficient evidence to recommend for or against the use of screening CBE alone or the teaching of breast self-examination.
American Cancer Society	• CBE and mammography annually beginning at the age of 40. CBE at least every three years, and breast self exam monthly, between the ages of 20 and 40.
American College of Radiology, American Medical Association, American College of Obstetricians and Gynecologists	• Routine screening with annual CBE and mammography every 1-2 years, beginning at age 40, and annual mammography beginning at age 50.
American Academy of Family Physicians	• Routine CBE every 1-3 years for women aged 30-39 and annually for women aged 40 and older, and mammography annually beginning at age 50.
American College of Physicians	• Screening mammography every 2 years for women aged 50-74. • Recommends against mammograms for women under 50 or over 75 years and baseline mammograms, regardless of risk.
National Cancer Institute	• Routine mammography and CBE every 1-2 years in women aged 40 and over at average risk of cancer.
Canadian Task Force on the Periodic Health Examination	• Annual CBE and mammography for women aged 50-69. • Recommends against mammograms in women under 50.

Proposed Rhode Island Recommendations
• For women without a family history of pre-menopausal breast cancer, CBE should be performed at the periodic health examination after the age of 30.
• Annual CBE and mammography after age 40. • For women with a first degree relative diagnosed with pre-menopausal breast cancer, annual mammography should commence 5-10 years prior to the age at which the relative was diagnosed. • Women with *BRCA1* and *BRCA2* mutations should receive annual or semiannual CBE, and annual mammography, beginning at age 25 to 35 years.

Rationale

When the Rhode Island Cancer Control Plan for 1990-1992 was published, the Director of Health determined that women 50 years of age and over should be screened by clinical examination of the breasts (CBE) and mammography annually, women 40-49 years of age should be screened by CBE annually and by mammography every 1-2 years, and women 35-39 years of age should be screened by CBE annually and by mammography once between the ages of 35 and 39, to establish a baseline for the interpretation of later mammograms. The proposed recommendations represent a marked change from these recommendations and are based on the following information:

- According to the U.S Preventive Services Task Force, "While routine visits with the primary care clinician are important, performing the same interventions on all patients and performing them annually are not the most clinically effective approaches to disease prevention. Rather, both the frequency and the content of the periodic health examination should reflect the unique health risks of the individual patient and the quality of the evidence that specific preventive services are clinically effective." This position was endorsed by the American Medical Assocation in 1983.[3] Women in their thirties frequently visit primary care physicians for reasons related to reproductive health. Clinical breast examinations should be performed at these visits, which may also involve screening for other reproductive health conditions (e.g., cervical cancer).
- Breast cancer is the single leading cause of death for women 40-49 in the United States,[4] and the risk for development of breast cancer for women 40-49 increases steadily over this decade. The American Cancer Society and the National Cancer Institute now recommend routine mammography for women in this decade, and the federal government is moving to require Medicaid, Medicare, and federal employee health plans to incorporate these recommendations. A recent panel of experts convened by the National Cancer Institute reviewed data from eight large randomized clinical trials of mammography screening of women in their 40s, conducted over a span of three decades and recently updated. Of the eight trials, five showed a mortality benefit, and meta-analyses of these clinical trials estimate that the overall mortality benefit is 16-17%.[4] Several factors, notably crossover of participants between screened and unscreened groups, and improvements in mammographic techniques since the trials were begun, make it likely that the true mortality benefit is actually larger than that reported.
- The US Preventive Services Task Force finds insufficient evidence to recommend for or against routine CBE and mammography in women under 50 years of age. However, premenopausal women have denser breast tissue and up to one fourth of invasive breast cancers are not detected by mammography in 40-49 year old women.[4] Therefore, routine mammography in this age group should be supplemented with regular CBE.
- Data regarding the optimal frequency of mammography screening is limited, particularly for women 40-49 years of age. Among women 50 years of age and over, similar mortality reductions were measured in trials using periodicities of mammography ranging from 12 to 33 months, and a meta-analysis of the trials estimated that the reduction in breast cancer mortality was the same over screening intervals of one to nearly three years.[5] However, mathematical modeling studies[6,7] indicate that a greater proportion of interval breast cancers grow faster in younger, premenopausal women compared with older women. Therefore, a conservative approach, based on currently available scientific evidence and without consideration of cost-effectiveness, is to recommend annual mammograms for all women 40 years of age and over.

- It has been estimated that 5-10% of breast cancer cases are attributable to mutations in two recently identified genes, *BRCA1* and *BRCA2*, and the lifetime risk of cancer among carriers of these mutations is high. Testing for these mutations is increasingly available. In recognition of these developments, a task force organized by the National Human Genome Research Institute has issued recommendations for earlier, more vigilant surveillance for breast cancer among carriers of these mutations[8] compared to women at average risk for breast cancer.
- Scientific evidence does not support the effectiveness of breast self exam (BSE) for detecting earlier stage breast cancer nor for reducing mortality from breast cancer.[9] However, raising awareness among women to the state of their bodies, including their breasts, is to be encouraged, and women of any age who are motivated to learn and perform BSE should be assisted to do so. Unrelated to its lack of effectiveness for breast cancer, BSE, when performed regularly and thoroughly, has markedly increased the detection of benign breast lesions,[9] some of which may require treatment.
- It must be emphasized that screening mammograms apply only to women who are asymptomatic (i.e., women who have no symptoms of breast disease and whose CBE, performed by a health care provider, is within normal limits). Women with clinical findings on CBE, and those with abnormal screening mammograms should be followed up with appropriate imaging and diagnostic testing.[10]
- Other, newer techniques (magnetic resonance mammography—MRM, ultrasound, and radionuclide studies) may occasionally be used as adjunct diagnostic tests to supplement screening in particular subsets of women. These techniques are evolving and cannot now be considered as stand-alone screening tools. However, the use of some of these as breast cancer screening tools can be anticipated in the future.
- National guidelines for breast cancer screening, particularly those for mammography, have recently undergone marked changes and are likely to undergo more in the next few years as the results of long-awaited randomized controlled clinical trials become available. These could well lead to a reconsideration of the guidelines presented here. For this reason, review of the Rhode Island recommendations for breast cancer screening may be warranted before the next scheduled revision to the Rhode Island Cancer Control Plan.

Comments?

We invite your comments on the proposed recommendation and rationale. Please send them in writing to Dr. Joann Lindenmayer, either by fax (401-861-5751) or by mail (Rhode Island Department of Health, 3 Capitol Hill, Providence, RI 02908-5097)

References

1. Rhode Island Department of Health. *Cancer Control Rhode Island. Plan for 1990-1992.* Providence, RI: Rhode Island Department of Health, 1989.
2. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services, 2nd ed.,* Baltimore: Williams and Wilkins, 1996.
3. Periodic health examination—American Medical Association. Medical evaluations of healthy persons. Council on Scientific Affairs. *JAMA* 1983;249:1626-33.
4. NIH Consensus Development Statement Online 1997 January 21-23 [cited April 14, 1997]; 15(1):in press.
5. Kerlikowske K, Grady D, Rubin SM, et al. Efficacy of screening mammography: a meta-analysis. *JAMA* 1995;273:149-54.
6. Duffy S, Chen H, Tabar L, et al. Sojourn time, sensitivity, and positive predictive value of mammography screening for breast cancer in women aged 40-49. *Int J Epidemiology* 1996;25:1139-45.
7. Paci E, Duffy SW. Modelling the analysis of breast cancer screening programmes: Sensitivity, lead time, and predictive value in the Florence District Programme (1975—1986). *Int J Epidemiology* 1991;20:852-8.
8. Burke W, Daly M, Garber J, et al. Recommendations for follow-up care of individuals with an inherited predisposition to cancer II. *BRCA1* and *BRCA2. JAMA* 1997;277:997-1003.
9. Thomas DB, Gao DL, Self SG, et al. Randomized trial of breast self-examination in Shanghai: Methodology and Preliminary Results. *JNCI* 1997;89:355-64.
10. Schepps B, Fulton JP. Draft protocols for the evaluation of breast abnormalities. *Medicine and Health RI* 1997;80:96-7.

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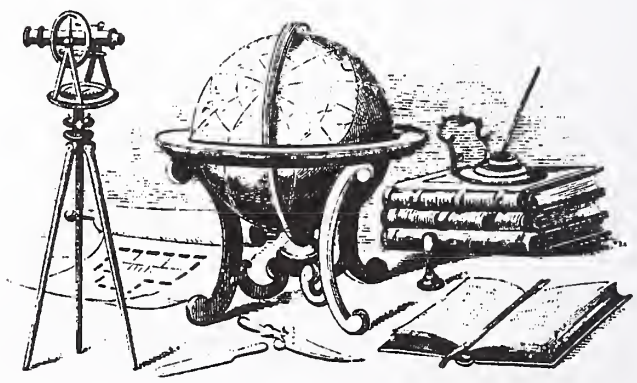

Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	December 1996	12 Months Ending with December 1996	
	Number	Number	Rates
Live Births	1,216	13,423	13.6*
Deaths	1,042	9,692	9.8*
Infant Deaths	(4)	(73)	5.4#
Neonatal deaths	(3)	(56)	4.2#
Marriages	446	7,927	8.0*
Divorces	241	3,228	3.3*
Induced Terminations	413	5,438	405.1#
Spontaneous Fetal Deaths	132	945	70.4#
Under 20 weeks gestation	(119)	(881)	65.6#
20+ weeks gestation	(13)	(64)	4.8#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	June 1996	12 Months Ending with June 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	247	3,259	329.3	4,321.0
Malignant Neoplasms	191	2,582	260.9	7,299.0
Cerebrovascular Diseases	34	603	60.9	652.0
Injuries (Accident/Suicide/Homicide)	25	336	33.9	6,188.5**
COPD	33	363	36.7	315.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 989,794
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

Percussion and Stamps

Leopold von Auenbrugger (1722-1809) [Austria, 1937, B157] is recognized by history for development of the percussion technique in physical examination, a helpful aid in the diagnosis of disease, particularly thoracic disorders. Unfortunately, his professional peers did not recognize his substantial contribution to medicine until shortly before his death. Born in Austria, Auenbrugger was educated in medicine at the University of Vienna, receiving his degree in 1752. He was later appointed as Physician-in-Chief at Holy Ghost Hospital in Vienna.

During his formative years, he worked in his father's public inn, where he learned the technique of thumping the wine barrels to determine how much wine each contained. The quality and resonance of the sound produced by thumping the side of the barrel at successive levels indicated the height of the wine within the cask - and inferentially therefore, its relative volume.

In 1761, Auenbrugger published his memorable book *Inventum novum ex percussione thoracis humani ut signo abstrusos interni pectoris morbus detegendi* ["Invention to Detect Thoracic Problems with Thoracic Percussion."]

Auenbrugger divided percussion sounds into four categories: natural, high, dull and muscle sounds. The type and relative flatness or echoing resonance of the ensuing sound was regarded as an indication of the relative aeration, fluid accumulation or solid tissue beneath the percussing finger. He believed that this methodology, with training, would yield considerable information concerning the physical nature of the underlying thoracic tissues and hence, also, some notions regarding diagnosis and prognosis.

He stated in his text that percussion also provided information concerning the shape and size of the heart and the condition of the pleural cavity [for example, whether or not it contained fluid.] This revolutionary proposal was not readily accepted and Auenbrugger was subjected to severe criticism; he was finally forced to resign his hospital post and he then entered private practice for the remainder of his career.

Jean Nicholas Corvisart (1755 - 1821) [France, 1964, #B 385] was Napoleon's personal physician. In

1808, almost 50 years after Auenbrugger's text was published, Corvisart translated *Inventum Novum* into French. The percussion method, as a component of a physical examination, was then successfully introduced - and accepted - throughout Europe.

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Ninety Years Ago

[June, 1907]

William McDonald, MD, discusses the increasingly prevalent problem of mental disturbance and aphasia. He describes the typical elderly woman who is sent to the hospital because there is no one to care for her at home and because progressively failing memory, childish actions and erratic judgment prevent her from caring properly for herself. She is, at the time of admission, "no better and no worse off than ten thousand other old women who have toiled up the pathway of life to the summit and are to be found on the descent into the valley of second childhood." The article describes a very complete general and neurological examination of this person. The following abnormalities are recorded: inability to comprehend and distinguish various characteristic sounds [eg, the crowing rooster]; a word deafness such that the hearing of a name does not arouse any functional concept of the object; auditory aphasia; a lack of visual recognition [aphasia] of common objects; visual anomia; astereognosis; stereognostic aphasia; cognitive anosmia; paraphasia; selective agraphia. The author concludes: "Our sole object in presenting this paper is to show that by closer clinical study of our mental and nervous cases it may be possible to add enormously to our knowledge of function and disease, and to prove that we cannot afford to neglect what at first sight might appear to be uninteresting material."

The relation of the roentgenologist to the medical community is discussed by Percy Brown, MD, a Boston radiologist. He notes that it is ten years since an X-ray apparatus was employed for purposes of medical diagnosis. Since then the equipment has undergone much improvement but still presents difficult technical and mechanical problems for the practitioner. Nonetheless, many notable uses have now been found for Mr. Roentgen's machine. The author cites the work in Boston where chest X-rays have revealed much pathological information; the work of Cannon at Harvard using radio-opaque bismuth salts to outline the gastro-intestinal tract; elucidating diseases of the nasal sinuses; the precise location of foreign bodies; the verification and location of urinary calculi; sundry uses in dental surgery; and the employment of X-rays for the treatment of various dermatological and other chronic ailments.

Frank E. Peckham, MD, discusses the importance of roentgenology in fracture work. He concludes: "In a few words then the lesson is, to get all the information obtainable by means of Roentgenograms in order to know when and when not to splint and if splints and plaster are applied, to know whether they are holding or not; also to know how many fragments there are and whether or not operation is necessary. "

W. Louis Chapman, MD, summarizes the use of radiography in dental surgery, illustrating his paper with photographs of dental X-rays.

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Fifty Years Ago

[June, 1947]

The sixth annual Charles V. Chapin Oration is given by Stanhope Bayne-Jones, MD, discussing the control of typhus fever. The author first summarizes the history of the Rickettsial infections, the biological distinctions between their various pathogens, their animal reservoirs, their insect vectors, their means of transmission and the currently available techniques of control. He then considers the descriptive epidemiological aspects of these diseases, both in the United States and in various overseas sites. In mite-borne [scrub] typhus, the value of laundering clothes with substances that are miticidal is stressed. The author quotes Zinsser: "Typhus is not dead. It will live for centuries, and it will continue to break into the open whenever human stupidity and brutality give it a chance, as most likely they occasionally will."

Herman C., Pitts, MD, in his Presidential address to the Rhode Island Medical Society, discusses significant changes in the way in which medicine is practiced. In the face of major improvements in scientific resources, he stresses that science deals only with the pathologic aspects of illness; while the art of medicine deals with that intangible thing called morale and the subtle effects of the mind upon bodily functions.

The problems of the medical examiner in Rhode Island are summarized by Albert J. Gaudet, MD, stressing the utter inadequacy of the prevailing system within the state. The author urges the RI Medical Society to take the lead in pressing for remedial legislation.

Herman Marks, MD, presents a case of amebic dysentery in a Rhode Island child.

Twenty Five Years Ago

[June, 1972]

Stanley L. Inhorn, MD, discusses the abnormalities of sex development, paying particular attention to the chromosomal aspects of normal development, and such pathological entities as Turner's syndrome, Klinefelter's syndrome, supernumerary X syndromes, and various genetic mendelian mutations.

Primary immunodeficiency diseases are evaluated by Fred S. Rosen, MD. He discusses, in particular, congenital thymic aplasia [DiGeorge's syndrome], severe combined immunodeficiency, and the X-linked agammaglobulinemias.

W.D.Snively, Jr, MD, and Jan Thuerbach describe the hazards of over-breathing prior to underwater swimming. They note that voluntary hyperventilation prior to swimming may result in blackouts and subsequent drowning.

Editorials discuss such issues as the Area Health Science Education Center and the new Rubella Testing Act.

Without editorial comment, The Journal cites Hoerr's Law of medicine: "It is difficult to make the asymptomatic patient feel better."

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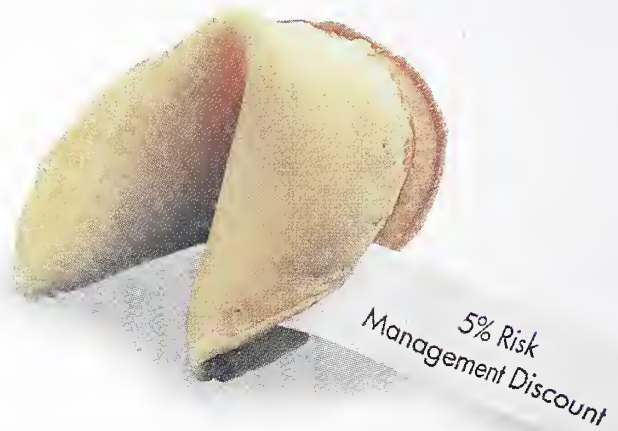

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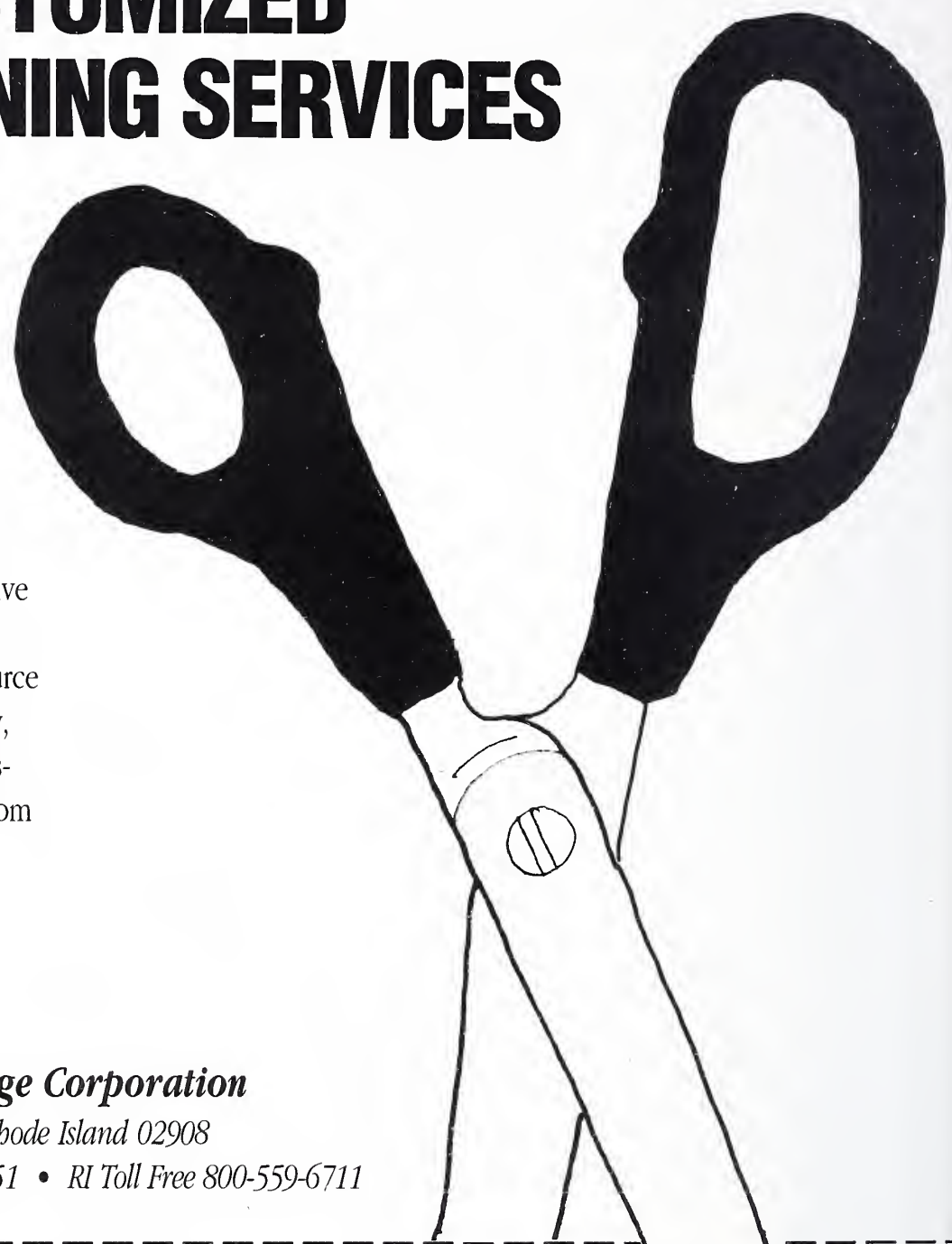

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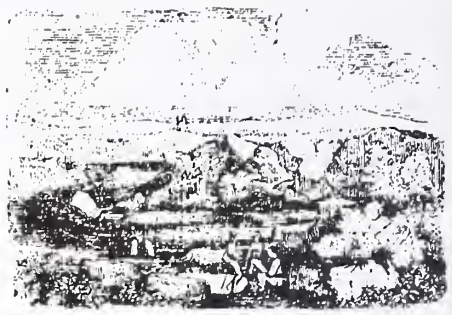


The Colic of Devonshire

The county of Devon sits astride the southwest coast of England bounded to the south by the English Channel and surrounded on land by the counties of Somerset, Dorset and Cornwall. If the sole criterion were the sharing of geographic names, then Devon would be the English county best known to southern New Englanders. The local communities of Taunton, Barnstable, Exeter, Tiverton, Dartmouth and Plymouth are all named after older Devonshire communities.

Devon is a heather-clad, hilly region, with a modest amount of valley land in tillage. Apple orchards are its principal agricultural pursuit and the local manufacture of cider has been Devon's most notable product since Saxon days when this region was part of the Kingdom of Wessex. Indeed, for over a millenium, Devon has been England's prime source of cider.

Harvesting of apples begins in late summer. Originally, the apples were crushed by a heavy pestle in rectangular wooden vats, with the apple juice flowing by gravity into oaken barrels then to be fermented into hard cider. This method proved to be inadequate to meet the growing demands for cider and, in the centuries that followed the Norman Conquest, simple mills were devised to speed up the crushing process. These mills consisted of circular stone vats, about ten feet in diameter, with drainage holes at their bottoms. A large circular millstone was rotated horizontally, around a centrally located vertical axis and powered by a mule or human labor. Fresh apples were fed constantly into the vat to be compressed by the revolving mill stone.

In 17th century England, cider was widely regarded as an excellent and inexpensive tonic suitable for the treatment of numerous disorders as diverse as leprosy and scurvy. [In truth, the high vitamin C content of cider did qualify it as a good antiscorbutic agent.] The consumption of Devonshire cider was impressive, averaging, by the 18th century, more than a pint per Englishman per day.

At this time physicians noted what seemed to be an increased incidence of gout often accompanied by episodes of sharp abdominal pain, referred to locally as the dry gripes or Devonshire Colic. Doctors generally ascribed these colicky episodes to noxious elements carried by the moist climate of southern England. Many of the local citizens, however, suspected that the cider was the cause of the disabling colic, particularly since those local pigs which consumed the apple-mash also seemed troubled by a similar disorder.

George Baker, a local physician, then undertook a careful study of what had grown to be an epidemic of colic in the Devon community. He noted, for example, that many who began with periodic colicky attacks had then progressed to a more serious disorder characterized by weight loss, pallor, progressive weakness, impotence, chronic constipation, and a peripheral neuropathy with bilateral wrist drop [called "the dangles"]. In some instances the afflicted individuals showed some loss of vision and seizures.

Baker was deeply impressed with the similarity between the Devonshire Colic and a similar disorder centered in the French wine district of Poitou [and called *Colica Pictonum.*] This colic was eventually associated with the adulteration of mediocre wines by lead salts, particularly lead acetate. Vintners, confronted with mediocre vintages, had often intentionally adulterated their product with lead sugar called *Saccharum Saturni.* This agent sweetens otherwise bitter wines and retards the further formation of vinegar. It is formed naturally when excessive vinegar in a mediocre wine reacts with the lead sheets lining the storage vat thus forming a soluble lead acetate. By the 15th century, this adultering practice had become a capital offense in the Moselle and Rhenish wine districts. Baker also saw many similarities between his local colicky patients and those clinical components of chronic plumbism found in lead workers, painters, potters, glass workers and others chronically exposed to lead in the work place.

Baker then speculated that the Devonshire Colic was still another manifestation of lead poisoning. And with further exploration he found that stone floors of many of the 6,000 Devonshire cider mills had been lined with sheets of lead to lessen the loss of cider through seepage. He took his hypothesis one crucial step further: he tested the fresh cider for lead content using a newly devised test for the presence of lead, employing an arsenous

NOTE ON COVERS:

Last month the Journal featured the work of Providence artist, Claudia Cockerill ("Summer in Providence"). This month we feature the work of another Providence artist, muralist Munir Deishinni Mohammed who designed the mural on the first floor of the Department of Health. In subsequent covers we plan to feature the work of more Rhode Island artists—befitting a state rich in both artists and beauty.

sulfide solution which, in the presence of soluble lead, causes a black precipitate to appear. By this crude test, Baker was able to demonstrate a substantial contamination of lead in the ciders of Devonshire.

In the annals of medicine, Baker's efforts represented a notable advance: he put forth an etiologic hypothesis based upon the coexistence of certain clinical signs and symptoms with the excessive consumption of cider. He strengthened his contention by seeking analogies between the Devonshire disorder and those syndromes previously shown to be caused by lead-contaminated alcoholic spirits. He then applied an objective laboratory procedure to demonstrate that the innocent-looking Devonshire ciders were indeed heavily laced with lead salts. His findings were published in 1767, in a brief text entitled, *"An Essay Concerning the Cause of the Endemial Colic of Devonshire,"* one of the great masterpieces of epidemiologic inquiry.

– Stanley M. Aronson, MD

Sylvius and the Corner Saloon

The scene is uniquely American: late afternoon in a cocktail lounge; subdued lighting; the barely heard sounds of a dissolute pianist playing some nostalgic Gershwin melody; two people coming together in whispered liaison, gazing into each other's eyes while raising their stemmed martini glasses in a silent toast to things that were and things that soon might be.

The martini cocktail, called by E.B.White the elixir of quietude, consists of chilled gin, shaken or stirred with but a token amount of dry vermouth. The motion pictures of the Depression era were accented by well-dressed actors and actresses swilling martinis as their way of banishing care and bringing brilliance and wit to an otherwise banal conversation. And since the 1930's, this cocktail has assumed a uniquely privileged role within the drinking habits of the American public. Many regard their daily martini more as a religious experience than a means of achieving rapid decompression.

The beginnings of gin, however, will not be found in any barkeeping archive. Rather, its origin can be traced to the therapeutic efforts of a 17th Century Dutch physician. Franciscus de la Boë, better known by his Latinized name of Sylvius, was born in 1614, the son of a transplanted French family. Following his education as a physician, Sylvius achieved great fame as the founder of the iatrochemical school of medical theory. He strived to reconcile two radically new physiologic precepts within the older beliefs of classical medicine: first, that there were complex interactions and affinities between the chemicals constituting the living body; and second, the novel belief that blood was constantly circulating while playing an intimate role in the subtle kinetics of the body.

Sylvius, who was Professor of Medicine at the great medical school in Leyden, taught that fevers and other disabilities were the manifestations of internal chemical disturbances; that disease was a life process gone astray; and that health required that the proper proportions and relationships of these chemicals be reestablished. As Professor of Medicine, he boldly reinstituted the practice of bedside teaching, dormant since its use centuries before at Padua; further, he established a chemistry laboratory adjacent to the clinical ward.

His laboratory studies included primitive chemical analyses of biological fluids including saliva and gastric juices. And he and his colleagues were among the first to explore the chemical abnormalities associated with metabolic diseases such as diabetes mellitus.

Sylvius advocated a properly balanced diet for his patients. His prescriptions regarding specific foods to be consumed were often quite detailed and he even recommended which spirits should accompany these meals. His observations led him to assert that the berries of the juniper shrub had great merit as an appetite stimulant, as a carminative, as an agent capable of settling a disordered intestinal system and even as a cure for diseases of the bladder. After some experimentation he devised a filtered decoction of juniper berry juice in an alcoholic solution distilled from a corn mash, prescribing this drink to be taken prior to heavy meals. The juniper juice, sometimes augmented with coriander, imparted a curiously trenchant aroma and flavor and served to mask the harshness of the crudely distilled spirit.

The drink achieved an unanticipated acclaim both in the Netherlands [where it was called Hollander Schnapps] and in England where it was initially called English genevière [the French word for juniper] which, in time, was corrupted to the word, gin. The English prepared it as follows: the

fermenting mash of maize, malt and rye, with the addition of juniper juice, was repeatedly distilled to yield an unsweetened clear fluid called dry gin. Its popularity soared and by 1684, England produced 527,000 gallons of gin at the price of a pence per pint. By 1735 the yearly production exceeded 5,394,000 gallons, displacing all other hard liquors. Parliament took note of the alarming rise in rampant alcoholism, particularly in the poorer classes, and began to place taxes on gin. Berkeley, decrying the excessive consumption of gin as the basis for moral corruption in both upper and lower classes, declared darkly, "A nation lighted up at both ends must soon be consumed." William Hogarth, England's leading illustrator, engraved the famous Gin Lane series to emphasize the magnitude of depravity occasioned by gin-drinking.

During the Prohibition years, illegal distillers in the United States found that it was technically easier to produce gin [often called bathtub gin] than the more sophisticated whiskies. Gin consumption then flourished and when the Prohibition Amendment was repealed in 1933, there was a ready market for Sylvius' prescription. Straight gin was too reminiscent of the former speakeasy ginmill days and so a variant, the martini, was advanced as the embodiment of a newly liberated, light-hearted sophistication. Life was to become, in the words of Tom Lehrer, "Hearts full of youth, hearts full of truth, Six parts gin and one part vermouth." It is unlikely that Sylvius would have appreciated the expanded uses of his juniper juice.

– Stanley M. Aronson, MD

Sports Anemia and Gastrointestinal Bleeding in Endurance Athletes

Anthony Mechrefe, AB, Brian Wexler, AB, and Edward Feller, MD

Athletes participating in intense physical activity, especially long-distance running, frequently have a low hemoglobin concentration. This "sports anemia" is commonly due to a physiologic response to aerobic exercise which expands plasma volume. The result is that a *normal* number of red blood cell (RBC) is diluted, lowering the hemoglobin concentration and creating a dilutional *pseudoanemia*.[1] However, other causes of anemia have been proposed, including hematuria, intravascular hemolysis from trauma to RBCs, iron loss in sweat, dietary iron deficiency, impaired iron absorption, and gastrointestinal (GI) bleeding (Table1). Of these multiple potential causes, nutritional deficiency and digestive bleeding are most common. Blood loss into the gut is important because of its potential effect on health and performance. Post-race stool samples have revealed occult bleeding in 7-30% of marathoners, while ocasional instances of major upper or lower GI hemorrhage have been reported. Clinicians should be aware of the pathogenesis, prevalence, etiologies, and diverse clinical manifestations of GI bleeding in runners.

Athletes, especially those participating in endurance exercise, must minimize dehydration, ensure adequate nutritional intake, and use caution with medications which may predispose to bleeding (including anti-inflammatory drugs and oral contraceptives).

Abbreviations Used:

GI	Gastrointestinal
RBC	Red blood cell

Endurance Training and Iron Status

Laboratory standards of iron metabolism commonly change during intense athletic training. Studies in adolescent females, particularly susceptible to iron deficiency, have revealed that serum iron, transferrin saturation and serum ferritin commonly decrease to iron deficiency levels as conditioning progresses.[2] More commonly, exercise is associated with reduction in iron stores compared to non-exercising controls, but iron deficiency anemia is uncommon. Reports indicate a correlation between intensity of exercise training and iron status. Moderate training has been associated with less striking changes in iron stores and a lower risk of anemia. Progressive decrease in serum ferritin measured in successive years has been demonstrated in competitive runners, field hockey players, and synchronized swimmers. Studies assessing iron deficiency using bone marrow hemosiderin levels have demonstrated dramatic decreases in marrow iron stores in some distance runners.[3]

Prevalence of GI Bleeding in Runners

GI blood loss is a common, usually occult, occurrence in runners. Ehn et.al. used radiolabelled iron studies to docu-

Table 1

SPORTS ANEMIA -- ETIOLOGIES

- DECREASED ERYTHROPOIESIS
- IMPAIRED IRON ABSORPTION
- INTRAVASCULAR HEMOLYSIS
  - (1) DIRECT TRAUMA TO RED BLOOD CELLS FROM EXERCISE
  - (2) HYPERTHERMIA REDUCES RBC SURVIVAL
- DIETARY IRON DEFICIENCY (MOST COMMON)
- IRON LOSS IN SWEAT
- GI BLEEDING
  - (1) OCCULT
  - (2) HEMATEMESIS
  - (3) MELENA
  - (4) HEMATOCHEZIA
- HEMATURIA
- PSEUDOANEMIA (PLASMA VOLUME EXPANSION)

ment negative iron balance during endurance training in elite male runners with decreased bone marrow iron.[3] An accelerated loss of radioiron compared to controls, associated with a normal incorporation of labelled iron into RBCs was assumed to be due to an increased rate of blood loss. Several groups have reported occult GI bleeding in marathon runners using pre and post-race stool guaiac testing with prevalence of blood in post -race specimens ranging from 8-30% (Table 2).Baska and co-workers found that 83% of runners after a 100-mile ultramarathon had guaiac positive stools, supporting the contention that intensity and duration of exercise correlate with blood loss.[4] More sensitive quantitative tests using fecal hemoglobin concentrations have been reported. In one study, the mean fecal hemoglobin concentration of runners prior to a race was 0.99 mg/g and 3.96 mg/g after the race; 21 of 24 runners had increased fecal hemoglobin in post-race samples compared to pre-race levels.[5]

Effect of Iron Stores on Performance

Iron deficiency severe enough to produce anemia decreases maximum oxygen consumption and diminishes exercise capacity.[2] However, iron deficiency *without* anemia has not been shown to have adverse effects on aerobic capacity. In a study of 40 female long-distance runners with mild iron deficiency, iron supplementation for 2 months did not improve exercise performance despite normalization of mean serum ferritin levels.[6] Others have confirmed that low serum ferritin levels(< 20 micrograms/L) do not affect performance in the absence of pre-existing anemia despite improvement in hemoglobin. Thus, iron supplementation without documented iron deficiency anemia is unwarranted.

Causes of GI Bleeding in Endurance Athletes

Intense physical activity decreases visceral blood flow to 20-50% of baseline as blood is shunted to skin and exercising muscle.[7] The stomach and colon are susceptible to ischemic damage at times, potentiated by dehydration and hypovolemia. Evidence to support this mechanism as a source of blood loss in athletes has been found in multiple studies using endoscopy to demonstrate ischemic colitis or gastritis in runners with bleeding after prolonged endurance exercise. Schwartz, et.al. investigated 7 runners with fecal occult bleeding after a marathon.[5] In studies performed within 48 hours of the event, 3 had areas of ischemic colitis, and 2 had gastric erosions indicative of ischemia. Similar findings have been reported in cyclists and hikers, documented by endoscopy performed in rare cases of major rectal bleeding. Isolated cases of mesenteric infarction have been described after endurance exercise. In some cases, pre-event endoscopies had been normal and repeat studies after a period of rest from exercise revealed normal mucosa of the upper and lower GI tracts. Aerobic exercise also decreases lower esophageal sphincter pressure, potentiating reflux esophagitis as another possible source of digestive bleeding. Physical activity may also produce rectal chafing, resulting in hemorrhoidal bleeding. Other mechanisms proposed include direct trauma to viscera from running on hard or uneven surfaces or mucosal damage from non-steroidal anti-inflammatory medication (Table 3).

Conclusion

Iron deficiency or digestive bleeding after aerobic exercise is mutifactorial. Intensity and duration of physical activity correlate with presence of occult or macroscopic bleeding. In selected individuals, treatment may include

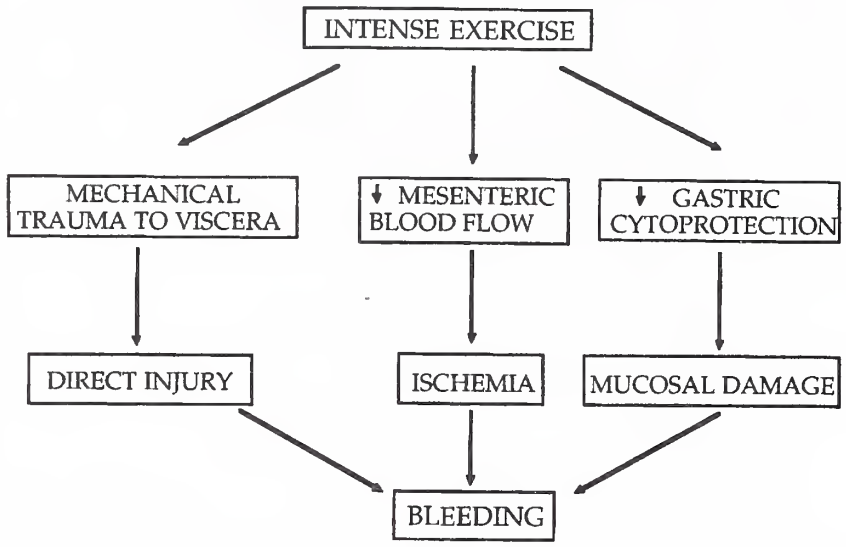
Table 2

OCCULT BLOOD LOSS - MARATHON RUNNERS

STUDY (EVENT)	NO. SUBJECTS (% RESPONSE)	PRERACE % POSITIVE (OCCULT BLEEDING)	POSTRACE % POSITIVE (OCCULT BLEEDING)
PORTER (MARATHON)	36 (54)	0	7.4
MCMAHON (MARATHON)	32 (59)	3	22
SCHWARTZ (MARATHON)	41 (40)	0	22
BASKA (ULTRAMARATHON)	34 (36)	3	85
MCCABE (MARATHON)	125 (21)	11.2	29.6
HALVORSEN (MARATHON)	63 (63)	7.9	12.7

Table 3

GI BLEEDING - PATHOPHYSIOLOGY



dietary changes, acid-suppressing medication to prevent upper GI mucosal damage or change in training. Athletes, especially those participating in endurance exercise, must minimize dehydration, ensure adequate nutritional intake, and use caution with medications which may predispose to bleeding (including anti-inflammatory drugs and oral contraceptives). Caution is needed in attributing blood loss or iron deficiency to exercise-related causes without considering underlying organic disease of the digestive tract.

References

1. Eichner ER. Sports anemia, iron supplements, and blood doping. *Med Sci Sports Exerc* 1992; 24(Suppl. 9): S315-S318.
2. Cook JD. The effect of endurance training on iron metabolism. *Semin Hematol* 1994; 31: 146-154.
3. Ehn L, Carlmark B, Hoglund S. Iron status in athletes involved in intense physical activity. *Med Sci Sports Exerc* 1980; 12:61-64.
4. Baska RS, Moses FM, Graeber G, Kearney G. Gastrointestinal bleeding during an ultramarathon. *Dig Dis Sci* 1990; 35:276-9.
5. Schwartz AE, Vanaunas A, Kamel PL. Endoscopy to evaluate gastrointestinal bleeding in marathon runners. *Ann Int Med* 1990;113: 632-3.
6. Nickerson HJ, Holubets M, Tripp AD. Decreased iron stores in high scxhool female runners. *Am J Dis Child* 1985; 139: 1115-9.
7. Qamar MJ, Read AE. Effects of exercise on mesenteric blood flow in man. *Gut* 1987; 28: 583-7.

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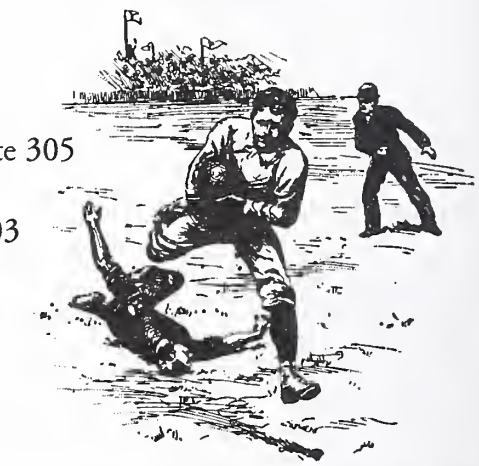

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The Surgical Treatment of Complex Gastroesophageal Reflux Disease

Henning A. Gaissert, MD

Many manifestations of abnormal gastroesophageal reflux are well controlled with modern acid-suppressing agents. When reflux disease is refractory to medical therapy or freedom from daily medications is desired, standard antireflux operations protect reliably from exposure to gastric contents. Despite effective medical and surgical therapy, there remain a number of patients in whom acid reflux disease is termed "complex", because they suffer the sequelae of severe esophagitis and do not seem good candidates for a standard antireflux operation or they have failed a previous surgical attempt to correct reflux. These patients may present with unremitting acid reflux or dysphagia due to anatomic obstruction. The restoration of satisfactory swallowing and reflux protection in the presence of these and other anatomic and functional abnormalities represents a challenge for any physician concerned with gastroesophageal reflux disease.

Successful reconstruction in patients with complex reflux-related esophageal disease is based on a thorough understanding of the individual esophageal anatomy and function. Often these patients have undergone one or more operations on their esophagus. The likelihood of a satisfactory outcome decreases with the number of failed operative procedures, and careful evaluation is essential to precisely identify the cause of failure. This evaluation should include contrast radiography to assess esophageal anatomy and the relationship of esophagogastric junction and diaphragmatic hiatus, endoscopic examination to demonstrate mucosal abnormalities, stricture, or the location of a previously constructed gastric wrap, and a motility study to ascertain normal esophageal peristalsis. The goal of therapy in these disorders is complete control of acid reflux and return of satisfactory swallowing. In most patients, these aims are accomplished with preservation of the native esophagus, while esophageal resection is required only in a minority. While it should be kept in mind that esophageal reflux disease is a benign condition usually not affecting the longevity of the patient, many patients with this condition are young and indeed suffer from abnormal swallowing.

Peptic stricture, severe esophagitis, and acquired shortening of the esophagus

The early stages of chronic acid exposure in the esophagus consist of mucosal and submucosal inflammation with superficial erosions. A peptic stricture results from more advanced inflammation with deep erosions and confluent, circumferential ulcers. The stricture is typically located just above the squamocolumnar junction or may develop at that junction higher in the esophagus when normal squamous epithelium is replaced with columnar lining in Barrett's esophagus. Strictures related to other causes, such as lye ingestion, nasogastric tubes, and those at the esophagogastric anastomosis after esophagectomy may be longer or have a different location.

In severe esophagitis, the inflammation involves the entire wall thickness. This panmural inflammation leads to fibrosis and vertical scarring with varying degrees of esophageal shortening even in patients without prior surgery. Acquired shortening may incarcerate the esophagogastric junction above the diaphragm and facilitate further enlargement of a hiatus hernia. Esophageal shortening should be sought before surgical correction of reflux, because a standard antireflux procedure such as the Nissen fundoplication or the Belsey repair may be avoided. These procedures depend on placing a lower esophageal segment into the abdomen for protection from

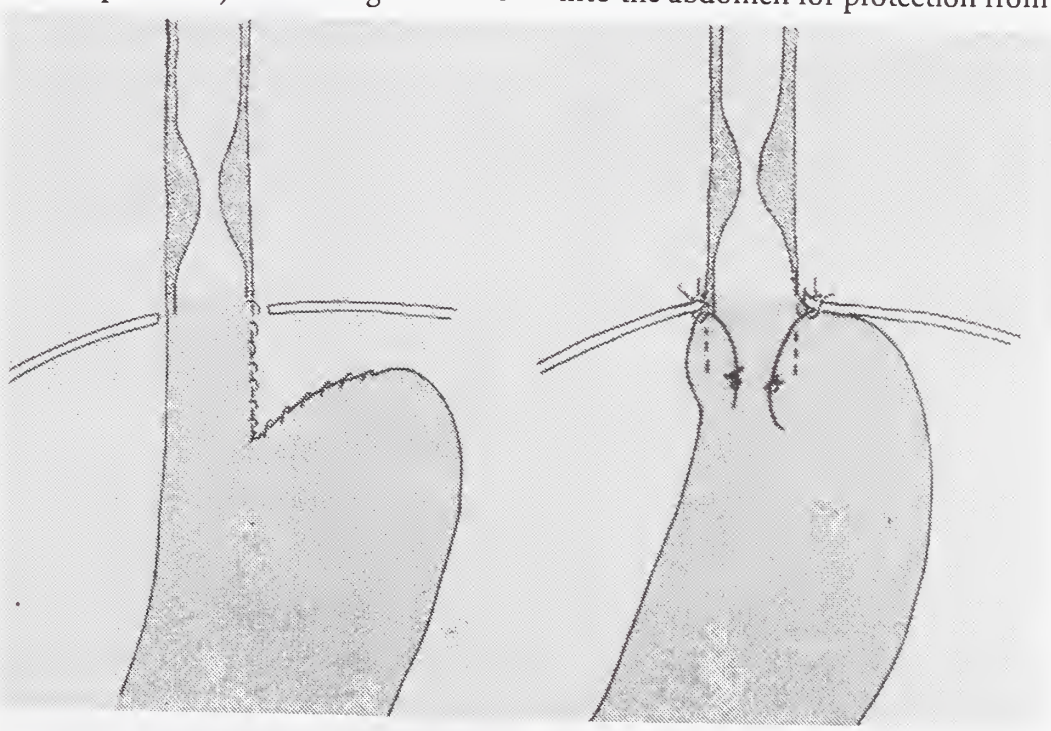


Figure 1. This diagram illustrates the additional esophageal length gained by a Collis gastroplasty (left panel). The Belsey fundoplication around the gastroplasty tube is now performed without tension on the esophagus (right panel). Reprinted with permission from Pearson FG. Hiatal hernia, gastroesophageal reflux, and other complications. p.264. In Pearson FG et al.(eds). *Esophageal surgery*. Churchill-Livingstone, New York, 1995.

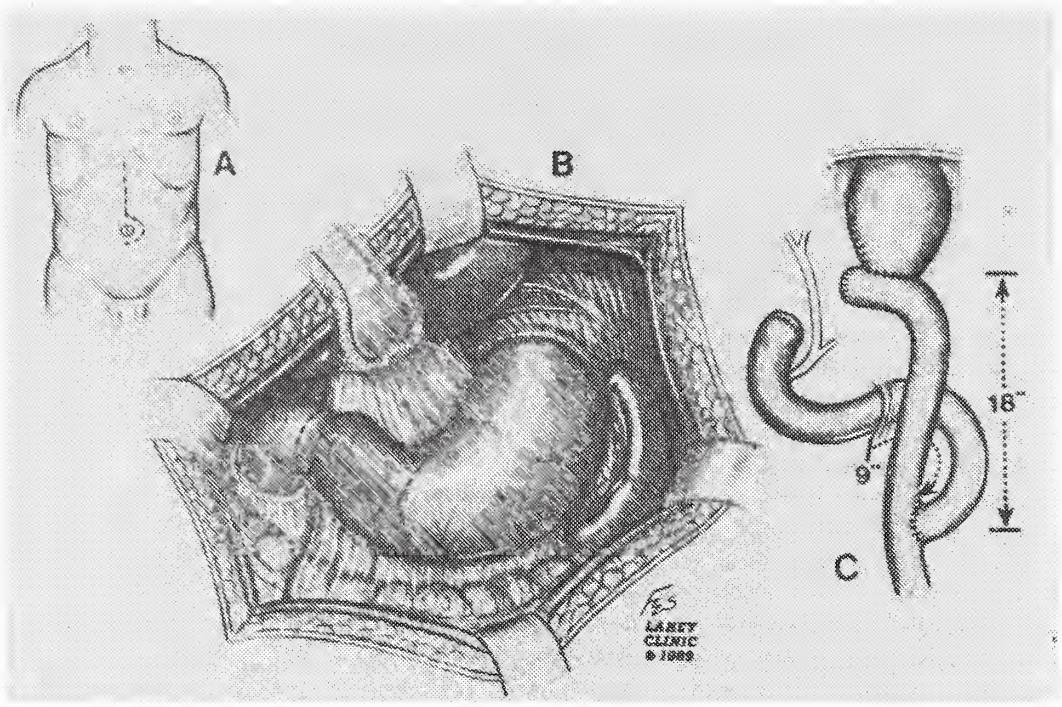


Figure 2. Operative technique of acid reduction and complete duodenal diversion. A: Incision. B: Operative site outlining the area of gastric resection. C: Roux-en-Y reconstruction. Reprinted with permission from Ellis FH, Gibb SP: Acid-suppression and alkaline-diversion: a safe and effective operation for patients with complex benign esophageal disease requiring reoperation. p. 391. In Little AG, Ferguson MN, Skinner DB (eds): *Diseases of the esophagus, Benign Disease.* Vol. II. Futura, Mount Kisko, NY, 1990.

reflux. Tension on the repair caused by an already shortened esophagus weakens reflux protection and is associated with a higher rate of recurrence.

Although treatment with proton pump blockers such as Omeprazole® is effective in healing esophagitis, fewer than half of all patients with confluent ulcerations or Barrett's ulcer heal completely and more than 80% of patients with erosive esophagitis recur within 6 months after cessation of therapy.[1] Data from this and other trials suggest that erosive panmural inflammation is not completely controlled with current medical therapy committing, even if healing occurs, the patient to long-term drug treatment.

The anatomic obstruction caused by a peptic stricture is not relieved by medical therapy alone and requires therefore esophageal dilatation. A comparison of cimetidine with placebo in a double blind, randomized crossover study in patients with peptic stricture showed that stenosis did not resolve in either group.[2] Omeprazole has not been evaluated using this study design. Esophageal dilatation achieves a satisfactory lumen in over 90% of patients.[3] Many patients, particularly those with good control of esophagitis, are well managed with medical therapy and interval dilatation.

Surgical options in complex reflux disease

Following successful dilatation, an antireflux procedure will result in lasting relief from obstruction and reflux in a majority of patients with peptic stricture.[3,4,5] The choice of operation in the setting of peptic esophagitis and acquired shortening is controversial because of the sheer number of available options and a lack of objective preoperative selection criteria. The following approaches are available to correct gastroesophageal reflux in selected patients with peptic stricture and esophagitis.

1. *Standard antireflux procedures*, the Nissen fundoplication, the Belsey Mark IV repair, and the Hill posterior gastropexy, are commonly performed and therefore selected by many surgeons for patients with a stricture. In the absence of acquired shortening, transposing the lower 3 to 4 cm of esophagus into the abdomen is easily accomplished for both Nissen and Belsey procedure. However, neither operation is designed to withstand tension, and the incidence of recurrent reflux in patients managed with Belsey repairs is high in the presence of acquired shortening.[6] Among standard operations, the Hill procedure alone has shown good results even in patients with peptic stricture,[4,7] presumably because the esophagogastric junction is anchored during this operation to the strong median arcuate ligament.

A laparoscopic approach, currently favored because of shorter recovery periods, does not alter the principal design of the antireflux procedure and should not improve or diminish its results. Peritoneal gas insufflation during the procedure elevates the diaphragm and may help to displace a shortened esophagus into the abdomen for construction of the fundic wrap. The release of gas at the end of the operation, however, would subject such a repair immediately to tension. Long-term evaluation of results after laparoscopic esophageal surgery is still awaited.

The presence of some degree of esophageal shortening is prudently assumed in most patients with ulcerative esophagitis and peptic stricture and should be considered in the selection of the antireflux repair.

2. *Intrathoracic antireflux repairs* place the reflux preventing mechanism in the chest. Thal[8] proposed to incise the stricture and patch the defect using a fundic flap above the diaphragm. His "esophagogastroplasty" derives its reflux-protecting properties from a partial fundoplication which proved incompetent in a substantial proportion of patients. Dissatisfaction with this technique led Hollenbeck and Woodward[9] to propose a modification with complete fundoplication comparable to a Nissen-type wrap.

Dilatation of the stricture followed by a supradiaphragmatic Nissen fundoplication was introduced by Krupp and Rosetti.[10] While this operation has been supported over the years by other surgeons, its side effects, including gasbloat from intrathoracic retention of gastric air, and complications such as ulceration with perforation or hemorrhage have prevented

wider dissemination of this technique.[11]

3. The concept of *esophageal lengthening* by means of a gastroplasty was introduced to treat peptic strictures and short acquired esophagus.[12] The Collis gastroplasty is indicated as an adjunct to any hiatal hernia repair when the repair alone is expected to result in an unacceptable level of tension. A segment of gastric fundus is fashioned from the lesser curve of the stomach in continuity with the esophagus and the antireflux repair is constructed around the new esophagus. Pearson[13] employed a combination of the Collis gastroplasty and the Belsey Mark IV repair (see Figure 1) and provided long-term follow-up for 430 patients.[3] When this operation was performed for stricture or esophagitis as the first operation, 93% of patients were either asymptomatic or had minor symptoms requiring no therapy. The Collis-Belsey procedure achieved good results in 80% of patients after prior antireflux surgery, but in only 54% of patients when a primary motor disorder was the indication. Slightly inferior results are obtained with a variation of this procedure, the Collis-Nissen operation.[14]

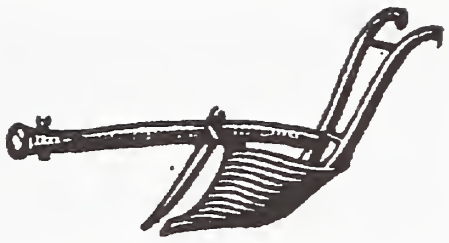
4. *Acid suppression and alkaline diversion* consist of truncal vagotomy, antrectomy, and Roux-en-Y gastrojejunostomy (Figure 2). This operation is based on the premise that elimination of acid, bile, and other upper gastrointestinal secretions from the esophagus should be as successful in healing the lower esophagus as a standard antireflux operation. The procedure is indicated when previous surgery at the esophagogastric junction prevents a technically adequate standard repair. Suitable candidates are patients with primary motor disorders such as achalasia or diffuse esophageal spasm, who develop reflux induced strictures after myotomy, and patients with scleroderma who have persistent reflux despite antireflux repair. A nondilatable esophageal stricture can be resected as part of the procedure.

Acid suppression and alkaline diversion have been popular in Europe. Fékété[15] from France reported the largest experience with 83 patients, of whom 80% had good results. In the United States, Ellis and Gibb[16] reported on 36 patients, with follow-up available in 33. Seventy-two percent had excellent or good results, with no or only occasional symptoms, and 12% had a fair outcome, with persistent symptoms of lesser degree. This outcome is remarkably good given that these patients present with the most difficult reflux-related problems.

Despite effective medical and surgical therapy, there remain a number of patients in whom acid reflux disease is deemed "complex," because they suffer the sequelae of severe esophagitis and do not seem good candidates for a standard reflux operation or because a previous surgical attempt to correct reflux has failed.

5. *Esophageal resection* is indicated in the presence of disease unreconstructable by any local antireflux procedure. In primary motor disorders, where reflux and stricture occur in an aperistaltic, distended and nonfunctional esophagus, the entire esophagus should be resected. Resection may be limited to the lower esophagus when motility of the esophageal body is preserved as in nondilatable strictures without underlying motor disorder.

Stomach, colon, and jejunum are available for reconstruction. The advantages of stomach are its reliable blood supply, the lesser complexity of creating a conduit, and the excellent long-term result achieved with its use.[17] The location of the esophagogastric anastomosis determines the functional



outcome of the operation. An intrathoracic esophagogastrostomy is prone to recurrent reflux, whereas a cervical anastomosis is usually well tolerated.

Intestinal interposition with colon or small bowel creates a passive swallowing tube which allows gravity-supported emptying of the esophagus and is resistant to acid reflux. A colon conduit is based on a straight, reliable vascular pedicle and may be used as a long or short segment. The length of jejunum is limited by its pedicle and reaches in the adult only to the aortic arch. Jejunum is therefore best selected for short segment interposition if esophageal body function is preserved.[18]

Esophageal substitution achieves satisfactory long-term palliation of swallowing; however, the operation is associated with a higher mortality and morbidity than nonresective procedures and should therefore be selected when other approaches have failed.

Intrathoracic Stomach

The vast majority of cases of intrathoracic stomach represent an enlargement of a sliding hiatal hernia. True paraesophageal hernias are quite rare. The positive intraabdominal pressure forces stomach through the hiatus, until one third or more of the stomach is permanently located in the chest. When most of the stomach has risen above the diaphragm, an organoaxial volvulus results from rotation of the body of the stomach around an axis formed by esophagogastric junction and duodenum until the posterior gastric wall faces anteriorly.

Obstructive symptoms or complications such as bleeding, gangrene, or perforation may occur suddenly after many years without symptoms. Our knowledge of the natural history of intrathoracic stomach is based on Skinner and Belsey's observation of 21 pa-

tients who received either medical treatment or none at all, of whom 6 died of acute complications caused by this condition. The risk of sudden catastrophe represents an indication for repair upon diagnosis of intrathoracic stomach.

Surgical correction consists of complete reduction of the hernia and narrowing of the hiatus to prevent recurrence. It is a matter of debate whether the repair should occur through the abdomen or the chest. If this condition is associated with gastroesophageal reflux and esophagitis, a left thoracotomy permits assessment of esophageal shortening and the addition of a gastroplasty to reduce tension on a hiatal hernia repair. In the event of perforation or necrosis, the thoracic approach provides a better exposure and improved drainage of the soiled mediastinum.

Abdominal vs. thoracic approach

In uncomplicated gastroesophageal reflux disease, the abdominal Nissen fundoplication has a slightly better long-term result (90% of patients remain free of recurrent symptoms) than the thoracic Belsey procedure (85%). This modest difference and the lesser discomfort of a laparotomy favor the Nissen procedure in these patients. Laparoscopy has further tilted the balance towards an abdominal approach. The advantages of the thoracic approach, less apparent in uncomplicated acid reflux, are most obvious in complex antireflux surgery. A thoracotomy allows the surgeon to mobilize the esophagus under direct vision and assess tension on the hiatus repair. If esophageal shortening is encountered, an esophagus-lengthening procedure can be selected.

The factors which influence the choice between abdominal and thoracic incision according to these principles, panmural inflammation, stricture, reoperation, can be identified before surgery to select the most appropriate approach in an individual patient. Since many patients undergoing antireflux surgery are young, long-term control of acid reflux is important. Ten or more years after the operation, esophageal function remains as important as at the time of surgery, while the length of postoperative recovery assumes a lesser role.

References

1. Hetzel DJ, Dent J, Reed WD, et al. Healing and relapse of severe peptic esophagitis after treatment with omeprazole. *Gastroenterol* 1988;95: 903-12.
2. Ferguson R, Dronfield WA, Atkinson M. Cimetidine in treatment esophagitis with peptic stricture. *Br J Med* 1979;2:472-4.
3. Pearson FG, Cooper JD, Patterson GA, et al. Gastroplasty and fundoplication for complex reflux problems. Long-term results. *Ann Surg* 1987;206:473-81.
4. Hill LD, Gelfand M, Bauermeister D. Simplified management of reflux esophagitis with stricture. *Ann Surg* 1970;172:638-51.
5. Henderson RD. Reflux control following gastroplasty. *Ann Thorac Surg* 1977;24:206-14.
6. Orringer MB, Skinner DB, Belsey RH. Long-term result of the Mark IV operation for hiatal hernia and analyses of their recurrences and their treatment. *J Thorac Cardiovasc Surg* 1972;63:25-33.
7. Mercer CD, Hill LD. Surgical management of peptic esophageal stricture. Twenty-year experience. *J Thorac Cardiovasc Surg* 1986;91:371-78.
8. Thal AP. A unified approach to surgical problems of the esophagogastric junction. *Ann Surg* 1968;168:542-50.
9. Hollenbeck JI, Woodward ER. Treatment of peptic esophageal stricture with combined fundic patch fundoplication. *Ann Surg* 1975;182: 472-7.
10. Krupp S, Rosetti M. Surgical treatment of hiatal hernias by fundoplication and gastroplasty. *Ann Surg* 1966;164:927-34.
11. Maher JW, Hocking MP, Woodward ER. Supra-diaphragmatic fundoplications: long-term follow-up and analysis of complications. *Am J Surg* 1984;147:181-6.
12. Collis JL. An operation for hiatus hernia with short esophagus. *J Thorac Cardiovasc Surg* 1957;34:768-.
13. Pearson FG, Langer B, Henderson RD. Gastroplasty and Belsey hiatus hernia repair. *J Thorac Cardiovasc Surg* 1971;61:50-63.
14. Stirling MC, Orringer MB. Continued assessment of the combined Collis-Nissen operation. *Ann Thorac Surg* 1989;47:224-30.
15. Fékété F, Pateron D. What is the place of antrectomy with Roux-en-Y in the treatment of reflux disease? Experience with 83 total duodenal diversions. *World J Surg* 1992;16:349-54.
16. Ellis FH, Gibb SP. Vagotomy, antrectomy, and Roux-en-Y diversion for complex reoperative gastroesophageal reflux disease. *Ann Surg* 1994;220:536-42.
17. Waters PF, Pearson GF, Todd TR, et al. Esophagectomy for complex benign esophageal disease. *J Thorac Cardiovasc Surg* 1988;95:378-81.
18. Gaissert HA, Mathisen DJ, Grillo H, et al. Short segment intestinal interposition of the distal esophagus. *J Thorac Cardiovasc Surg* 1993;106:860-7.

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Adolescents and Alcohol: Preventive Opportunities for Health Care Providers.

Suzanne M. Colby, PhD, and Tammy Chung, MA

The high prevalence of alcohol and other substance use problems among adolescents is cause for concern. Although physicians and other health care practitioners have an opportunity to impact on adolescent substance use, research indicates that they generally fail to identify the at-risk adolescent user and family.[1] This article provides an overview of current prevalence and trends related to adolescent alcohol use, consequences associated with that use, and describes recommendations for preventive interventions with adolescents.

Prevalence of alcohol and other substance use

Alcohol is by far the most widely-abused drug among adolescents. In 1995, 73.7% of 15,400 high school seniors participating in the Monitoring the Future Study reported having used alcohol (51% drank in the past month); in comparison, 64% had smoked cigarettes, 35% had used marijuana; and fewer than 5% had used cocaine.[2] Data from this study indicate that alcohol use is increasing among 8th and 10th graders, while remaining high but fairly stable among 12th graders (only 8th, 10th, and 12th grades were surveyed). Marijuana and cigarette use continue in an upswing which began about five years ago, with marijuana increasing sharply in the past two years. Use of other illicit drugs has been gradually drifting upward for the last several years. Overall, adolescents are initiating alcohol use and other drug use at earlier ages, and perceive less health risk and peer disapproval associated with alcohol and other substance use.

Rhode Island data

The Rhode Island Department of Health (RIDOH) conducts its own biennial survey of public middle and high school students. In 1995, over 29,000 RI youth in grades 7 to 12 participated in the fourth RI Adolescent Substance Abuse Survey.[3] In general, rates of alcohol use, drunkenness, and other substance use are higher in Rhode Island than nationally (with the exception of cigarette and smokeless tobacco use). RI trends over time mostly mirror the national trends, with increases in alcohol, marijuana, and tobacco use, initiation of use at an earlier age, and decreased perceptions of health risk and peer disapproval. Additionally, the most recent ASAS found increased rates of drinking and driving, as well as attending school under the influence of alcohol or other drugs, compared with past surveys.

When asked about their substance use for the month prior to the survey, 67% of RI high school seniors reported using alcohol, 44% reported having been drunk, 34% used marijuana, and 12% used hallucinogens. About 1 in 10 high school seniors believed that their alcohol use was causing problems; this figure was the same for male and female students. Among 7th graders, more than 1 in 3 reported alcohol use in the month prior to the survey and more than 1 in 10 reported getting drunk once or more during that time; 1 in 20 said their alcohol use was causing problems. Of those who had used alcohol, about half said they began drinking in the 6th grade or earlier. Twenty percent of 7th graders reported using substances other than alcohol or cigarettes in the past month; most of those reported using inhalants or marijuana. Use rates for males and females through grade 10 are similar; in higher grades, males report greater increases in use and related risky behaviors.

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
ASAS	Adolescent Substance Abuse Survey
DSM	Diagnostic and Statistical Manual
ED	Emergency Department
GAPS	Guidelines for Adolescent Preventive Services
RIDOH	Rhode Island Department of Health

Consequences of adolescent substance use

With increasingly early initiation of alcohol and other substance use, large proportions of youth now use substances regularly throughout the onset and duration of puberty. Since this is a relatively new phenomenon, the extent of the health impact from this level of early use is not fully known. Alcohol and other drug use at an early age is an indicator of future drug or alcohol problems.[4] Moreover, use is associated with the three leading causes of death and injury among teenagers and young adults (motor vehicle crashes, homicides, and suicides). Alcohol is more likely to have been a factor in the fatal crash of a teenager or young adult (under age 25) than in other traffic fatalities.[5] In 1991, approximately 10% of clients admitted to state-funded alcohol treatment programs were under the age of 21.[6] Almost a third of youth in long-term, state-operated juvenile institutions in 1987 had been under the influence of alcohol at the time of their arrest.[7] About half of college students who report having been victims of crime also report using alcohol or drugs before the crime occurred.[8] Alcohol use is implicated in one- to two- thirds of sexual assault and acquaintance rape cases

among teens and college students,[9] and heavy alcohol use is associated with decreased use of condoms, placing teens at higher risk for contracting AIDS and other sexually transmitted diseases.[10]

Assessing Alcohol and Other Substance Abuse Problems Among Adolescents

The current level of adolescent alcohol and other substance use and associated problems points to the need to screen for and identify problematic use in adolescents. Unfortunately, no standard definition of the signs and symptoms indicating problematic substance use exists for adolescents. The DSM-IV substance disorder critera[11] developed for use with adults have been applied to adolescents, typically with few, if any, modifications. The DSM-IV describes two types of substance use disorders: abuse and dependence. The diagnosis of *substance abuse* has been conceptualized as a less severe form of addiction manifested by recurrent hazardous use (e.g., driving while intoxicated) or certain negative consequences of use (e.g., legal problems). In contrast, the diagnosis of *substance dependence* describes a pattern of impaired control over substance use (e.g., persistent efforts to quit or cut down), increased importance of substance use in relation to other activities, and signs of physical dependence (e.g., tolerance or withdrawal). However, unlike earlier DSM classifications, the current version does not require the presence of tolerance or withdrawal for a dependence diagnosis - any three (of seven) symptom criteria over a one-year period will suffice.

Despite widespread use of DSM-IV substance use criteria with adolescents, it is unclear whether adolescent and adult substance use problems are sufficiently comparable to justify the same criteria. Studies of adolescent substance use highlight development differences in the *pattern of use.* Specifically, high levels of substance use are relatively common in adolescence and may be temporary or self-limiting.[12] But while adolescents in treatment for substance use typically report briefer substance use histories compared to treated adults, adolescents progress more rapidly from first experimentation to problematic use.[13] A differential threshold for clinically significant adolescent substance use should be considered. For example, the presence of any substance-related symptom may be clinically significant depending on the teen's developmental stage (e.g., 13 year-old versus 17 year-old). Some typical *substance-related symptoms* experienced by adolescents have also been found to differ from those of adults, suggesting a need to identify developmentally-appropriate diagnostic criteria. Symptoms that have diagnostic significance for adults (e.g., withdrawal or alcohol-related medical problems) occur less frequently in adolescents because of their briefer substance use histories.[14] Specific indicators of hazardous substance use also differ. For example, adult hazardous substance use often takes the form of driving while intoxicated, but a comparably small proportion of younger adolescents drive or have access to a car. Driving while intoxicated, therefore, would be a less sensitive diagnostic criteria among adolescents younger than age 16. By contrast, younger adolescents more often report hazardous substance use in the form of associated vandalism and other illegal or high-risk behaviors, like shoplifting and unprotected sex.[15]

Alcohol is by far the most widely abused drug.

The most frequently reported symptoms of substance dependence in a sample of treated adolescent substance users involved: impaired control over use (using more of a substance than they intended, or for a longer period of time); and increased importance of substance use to the exclusion of other activities (spending less time on school and/or social activities).[16] Other indicators of problematic substance use that may be of diagnostic utility for adolescents include: carrying or using substances at school, alcohol-related blackouts, episodic binge-drinking, polysubstance use, and the co-occurrence of conduct disorder.[14]

In terms of assessing adolescent alcohol and other substance use, more research is needed to: 1) provide the basis for developing guidelines regarding a standard definition of problematic adolescent substance use; 2) develop reliable measures that are suitable for different purposes (screening, brief intervention, referral for treatment); 3) identify substance-related symptoms that have special diagnostic significance for adolescents; and 4) establish the predictive validity of the diagnoses, ie., whether diagnoses of abuse and dependence among adolescents are associated with a distinct course of use or response to treatment.

Clinical Guidelines for Adolescent Preventive Services

While much adolescent alcohol misuse may be time-limited without serious problems, we are unable to predict reliably which adolescents will desist from heavy use without problems, and which adolescents will persist. For this reason, the American Medical Association's Guidelines for Adolescent Preventive Services (GAPS)[17] recommend that clinicians consider all adolescent alcohol use initially as problematic. GAPS recommendations include the following:

1) In the context of promotion of responsible health behaviors, all adolescents should annually receive health counseling that includes encouraging the avoidance of alcohol.

2) As alcohol puts adolescents at risk for adverse health outcomes, adolescents should be screened annually for use of alcohol during the past year.

3) If use is revealed, the adolescent should be further assessed to determine circumstances surrounding use, level of use, and physical, psychosocial, and school functioning.

4) Adolescents who abuse alcohol should be referred for mental health evaluation and treatment.

Some physicians have recommended that pediatricians go beyond these guidelines when providing comprehensive adolescent medical care. Fuller and Cavanaugh[18] advise pediatricians to familiarize themselves with identifiable risk factors for the development of alcohol and other substance use problems, and then assess adoles-

cents and their families for these factors. The goal is to screen for risk factors and provide education to the patient and family years before substance abuse is a problem. Fuller and Cavanaugh also recommend that parents stay outside the examination room during appointments with adolescent patients, to establish confidentiality. Subsequently, the physician can begin to screen for early warning signs of use; still later, screening might include identifying signs of chronic use or abuse among adolescents. When confidentiality is assured, adolescents' self-reported alcohol and other substance use has been found to be accurate and reliable. Parents should be informed only when adolescents indicate that they are at risk of seriously harming themselves or others. By addressing potential areas of risk early on with the adolescent and family, in addition to addressing the stated medical purpose of the visit, pediatricians can deliver substantive, cost-effective preventive health care.

Adolescents, Alcohol, and Injury: Emergency Department and Trauma Settings

Alcohol is associated with adolescent injury. When blood alcohol level was routinely assessed upon admission to a hospital trauma center, alcohol was found to contribute to nearly half of the injuries suffered by youths aged 18-20.[19] In a year-long retrospective study at Rhode Island Hospital, investigators reviewed the medical records of all 13- to 19-year old Emergency Department (ED) patients who tested positive for alcohol.[20] The number of adolescent ED visits that were found to be alcohol-related was relatively small (N=160), surely limited by the fact that alcohol screening is not routine. Alcohol was more likely to contribute to adolescent injuries on weekend and night shifts. Among all alcohol-positive admissions, 50% were for alcohol toxicity with no injury, 22% were for assault-related injry, 14% for a motor vehicle crash, 7% for self-inflicted injury, and 6% for falls. None of the alcohol-related injuries were associated with sports.

Medical and counseling staff in the ED have a unique opportunity to impact on adolescent alcohol misuse. Receiving treatment in an ED for an alcohol-related injury may create a "teachable moment" when adolescents are open to advice about alcohol use. In an ongoing study at Rhode Island Hospital's ED, Monti, Colby and colleagues[21] are randomizing alcohol-positive adolescents (13 to 19 years-old) to receive either standard care, with informational handouts about alcohol misuse, or a one-hour motivational intervention aimed at reducing alcohol misuse and harmful consequences. Preliminary findings suggest that the brief intervention may be effective. Among older adolescents, the researchers are finding reduced alcohol use 3 months after the ED visit. This trial offers promising support for providing brief alcohol interventions in a pediatric ED.

Conclusions

Alcohol and other substance use is highly prevalent among adolescents, and rates of use are steadily increasing. Perhaps most worrisome, age at first use is declining, and many adolescents are using alcohol and other substances regularly throughout their vulnerable developmental years. At the same time, youths report decreased perceptions that drinking, driving after drinking, and use of various other substances pose a serious risk to their well-being. These perceptions persist despite the serious adverse consequences alcohol and other substances have on adolescents. Physicians have an opportunity to provide health education, advice, brief intervention, and/or referral for adolescents at risk for or engaged in alcohol or substance misuse. Practitioners who feel ill-equipped to address these issues with adolescents can access educational opportunities in the form of continuing medical education and other materials. Alcohol assessment and intervention efforts being conducted at Rhode Island Hospital provide encouraging examples of the potential impact physicians can have.

References

1. Friedman LS, Johnson BA, Brett AS. Evaluation of substance-abusing adolescents by primary care physicians. *J Adolesc Health Care* 1990;11:227-230.
2. Johnston LD, O'Malley PM, Bachman JG. *National Survey results on drug use from monitoring the future study, 1975-1995.* {NIH publication No. 96-4139.
3. Colby SM. *The 1995 Rhode Island Adolescent Substance Abuse Survey: Report of Statewide Results.* Providence, RI: RI Department of Health; 1996. Contract No. 1103-50400-267.
4. Hawkins J, Catalano R, Miller J. Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psych Bull* 1989;112:64-105.
5. Centers for Disease Control. Alcohol-related traffic fatalities among youth and adults- United States, 1982-1989, *MMWR* 1991;2-179.
6. Butynski W., Reda JL., et al. *State resources and services related to alcohol and other drug abuse problems, FY 1991.* An analysis of state alcohol and drug abuse profile data. Washington, DC: National Association of State Alcohol and Drug Abuse Directors; 1992.
7. US Department of Justice. *Survey of Youth in Custody.* Bureau of Justice Statistics Special Report; 1988.
8. Dodge S. Campus crime linked to students' use of drugs and alcohol. *The Chrconicle of Higher Education* January 1990;A33-35.
9. Office of the Inspector General. Youth and alcohol: Dangerous and deadly consequences. USDHHS;1992.
10. Hingson RW, Strunin L, Berlin HM, Heeren T. Beliefs about AIDS, use of alcohol and drugs, and unprotected sex among Massachusetts adolescents. *Am J Public Health* 1990;80:295-299.
11. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders.* 4th ed. Washington, DC:APA;1994.
12. Jessor R, Jessor SI. Adolescent development and the onset of drinking. *Digest of Alcoholism Theory and Application* 1983;2:5-13.
13. Brown, SA, Mott MA, Myers MG. Adolescent alcohol and drug treatment outcome. *Drug and Alcohol Abuse Prevention, Drug and Alcohol Abuse Reviews* 1990;373-403.
14. Martin CS., Kaczynski NA., Maisto SA, et al. Patterns of DSM-IV alcohol abuse and dependence symptoms in adolescent drinkers. *J Stud Alcohol* 1995;56:672-680.
15. Bukstein O, Kaminer Y. The nosology of adolescent substance abuse. *Am J Addict* 1994;3:1-13.
16. Stewart DG, Brown SA. Withdrawal and dependency symptoms among adolescent alcohol and drug abusers. *Addiction* 1995;90:627-635.
17. Elster AB, Kuznets NJ, ed. *Guidelines for Adolescent Preventive Services: Recommendations and Rationale.* Chicago,

IL: American Medical Association; 1994.
18. Fuller PG, Cavanaugh RM. Basic assessment and screening for substance abuse in the pediatrician's office. *Pediatr Clin North Am* 1995;42:295-307.
19. Rivara FP, Gurney JG, Ries RK, et al. A descriptive study of trauma, alcohol, and alcoholism in young adults. *J Adolesc Health* 1992;13:663-667.
20. Colby SM, Vallee JV, Monti PM, et al. Factors associated with positive blood alcohol tests among adolescents in an emergency department. Paper presented at the annual meeting of the Association for the Advancement of Behavior Therapy. Washington, DC: November 1995.
21. Monti PM, Colby SM, Spirito A, et al. Motivational interviewing for adolescent drinking: Preliminary results from an emergency department intervention study. Paper presented at the Addictions '96 Conference. Hilton Head Island, SC: September 1996.

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Cultural Factors in Eating Disorders: A Perspective from Singapore

Linda Shiue, AB

As a medical anthropology concentrator at Brown University, I chose to study in Singapore. Singapore interested me: it is a small (1/6 the size of Rhode Island), but culturally diverse, industrialized Southeast Asian island nation that combines elements of Chinese, Malay, Indian, and Western cultures. During my 6 months at the National University of Singapore, I learned much about Singapore's culture, both through formal study of sociology and religion, and through participant-observation. Through the latter process I became intrigued by a subject which would become my senior honors thesis.

The term "eating disorders" (ED) commonly refers to anorexia nervosa (AN) and bulimia nervosa (BN). These illnesses were familiar to me as a college student from the United States. Lay impressions as well as scholarly research, however, gave me the false belief that the EDs would not exist in Singapore. During my stay there, however, I learned that one of my new friends had, indeed, been suffering from AN and BN for the past several years of her young adult life. And by participant-observation I caught glimpses of a culture which is not inhospitable towards the development of ED psychopathology. After a semester back at Brown, doing an exhaustive review of the eating disorders literature, I spent another two months in Singapore. With support from the Council on International Educational Exchange as a Bowman Fellow, I began a study of the sociocultural context of eating disorders in Singapore.

Abbreviations Used:

AN	Anorexia nervosa
BN	Bulimia nervosa
DSM	Diagnostic and Statistical Manual
ED	Eating Disorders

METHODS

This study used the methods of medical anthropology, involving: (1) participant-observation, (2) structured interviews, and (3) written questionnaires. All participants were volunteers. Initially, knowledgeable sources—those health care professionals and others who were thought to have knowledge of the problem—were asked to comment on their experience with ED. Subsequently interviews of 42 subjects and surveys given to 391 Singapore students ages 13-25 (75% female) were used to gather data on media exposure, eating, exercise, fasting habits, body shape preferences, and awareness of ED.

DISCUSSION

Anorexia nervosa and bulimia nervosa are serious psychiatric illnesses with significant morbidity and mortality. Both are well-recognized clinically, especially in young Caucasian women in affluent Western societies. The prevalence among young American women in high school and college has been estimated to be 4%. Males account for 5-10% of cases. The stereotypical image of the eating disorder sufferer falling into a certain demographic category has implications both for diagnosis and treatment of people who do not fit that mold. Moreover, while the EDs are a known clinical entity in medicine and psychiatry, their

etiology and core psychopathology are only partially understood. ED have been explained by the synergy of psychological, biological and sociocultural factors. Cross-cultural studies therefore can provide insight. Case reports of EDs from different cultural contexts, in other words, can help us separate what *appears* to be involved in the development of EDs from the *true* etiology, whether in a Western, industrialized culture or in a completely different society.

Recent studies dispel the myth that eating disorders do not occur in either nonindustrialized or non-Western nations. AN and BN appear to be increasing in incidence not only in the West but in other cultures as well. Cases have been described in non-Caucasians in Britain and the US as well as in several countries in Africa, including South Africa, Nigeria and Egypt; and Asia, including Hong Kong, China, India, Pakistan, Malaysia and Singapore. These case reports document the occurrence of eating disorders in a variety of sociocultural settings. Few formal mechanisms exist for case registry of ED in non-Western settings, and few prevalence surveys have been conducted. Two studies in Asia estimate a 0.08% prevalence of ED in Japan and 0.03% in Hong Kong. One of the Singapore psychiatrists specializing in ED estimated an incidence of 10 cases per year in Singapore. Thus, though still rare, the presence of ED in non-Western settings suggests the need for a critical reexamination of the sociocultural factors that have been implicated in the development of eating disorders.

These sociocultural factors include a thin beauty ideal (encouraging dieting), social changes from Westernization, urbanization or immigration, the "legitimization" and publicizing of eating disorders as medical conditions, competition (in dance, sport, academic performance) and peer models. The importance of the thin ideal and competitiveness, for instance, is borne out in studies showing certain subgroups to be "high-risk" for eating disorders: models, ballet students and gymnasts - those for whom thinness is a professional requirement. Indeed, some of these factors are characteristics of Singapore culture.

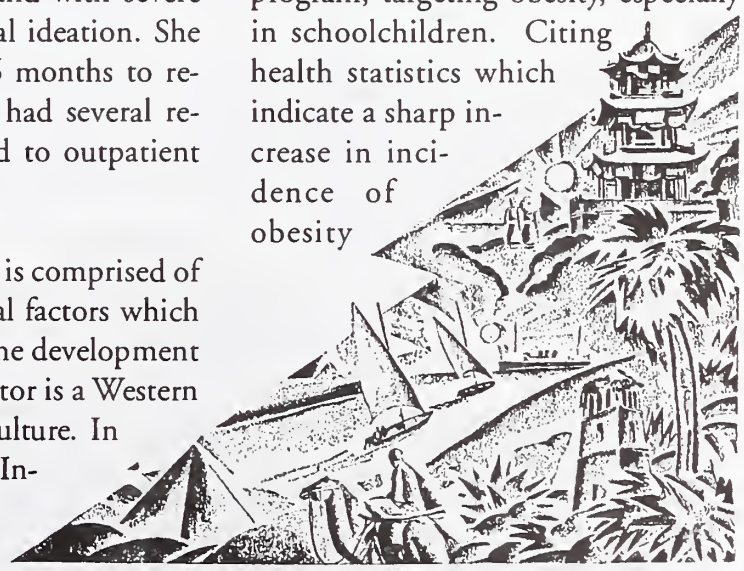
In Singapore, case reports have described presentations of eating disorders which, like cases in the West, combine psychological factors with a thin ideal.[1] Most ED cases are Chinese adolescent and young adult females, but all of Singapore's ethnicities and both sexes are represented. One typical case follows:

Eating disorders have been explained by the synergy of psychological, biological and sociocultural factors. Cross-cultural studies, therefore, can provide insight.

H.T. is a Malaysian Chinese female who was 18 years old at presentation. Her ED symptoms began when she came to Singapore to study. She learned about ED from her science classes and also from the Western fashion magazines she avidly read. She also had several risk factors for ED— she came from a prominent family with poor communication, felt scrutinized by people outside her family, and felt herself inferior to her successful, perfect, model older sister. She presented with 30 lbs. weight loss in her first month in Singapore and with severe depression and suicidal ideation. She was hospitalized for 6 months to restore her weight, but had several relapses once discharged to outpatient therapy.

Singapore culture is comprised of both Western and local factors which may be conducive to the development of ED. One major factor is a Western import, the slimming culture. In contrast to traditional Indian and Chinese cultural preference for fatness, associated with prosperity, the current aesthetic among most young Singapore residents is thinness. Fashion trends for young women emphasize close-fitting, body-revealing clothing, with fashion magazines depicting both local and Western (Caucasian) models. Weight-loss clinics are thriving, with sales of amphetamines and other appetite suppressants at $1 million dollars per year, most purchases being made by teenage and young women. Almost 40% of survey respondents reported having dieted to lose weight. The thin standard of beauty is juxtaposed incongruously with a food-preoccupied culture where tradition and religion prescribe both feasts and fasts. Of note, Hsu and Lee[2] question the inclusion of a desire for thinness in DSM-IV criteria for AN, suggesting that it may be too [Western] culture-specific. Indeed, cases of eating disorders from several non-Western countries, including Hong Kong, India, Kenya and Malaysia, demonstrate that a thin ideal/fear of fat may be absent, and when present may reflect Westernization.

Local factors in Singapore culture include being "kiasu," or intensely competitive. Competitive subcultures are predisposed towards ED. Furthermore, Singapore's population is uniquely receptive to its government's policies and propaganda, as evidenced by the success of government-run courtesy campaigns, and others promoting marriage among young professionals and denouncing littering. During my fieldwork,[3] the government was launching a new health promotion program, targeting obesity, especially in schoolchildren. Citing health statistics which indicate a sharp increase in incidence of obesity



in Singapore's youth, the government campaign teaches healthful, low-fat diets, promotes exercise, and in some cases penalizes those judged obese (national servicemen, children). No mention, however, is made of ED.

Finally, a lack of awareness of ED as well as a powerful cultural stigma against seeking psychiatric help causes both misrepresentation and misdiagnosis. Most psychiatrists in Singapore stated that they had received no formal education or training on ED, and that most of their colleagues would not even consider ED in their differential diagnoses. Moreover, most patients with ED would be much more likely to seek the services of a general practitioner of Western or Chinese medicine, either of whom who would be even less familiar than psychiatrists with ED. Presenting complaints might be phrased in the language of gastrointestinal complaints ("bloating," "gastric,"), gynecology, or Chinese medicine ("energy imbalance.") This is similar to findings in a Hong Kong study, where hospitalized anorexics denied a fear of fat but instead ascribed their condition to: epigastric bloating (31.4%), lack of appetite (15.7%) or just eating less (2.9%).[4]

Conclusions

Eating disorders have long been conceptualized as afflictions of the modern, prosperous Western world. Described as a complex interplay of psychological, biological and sociocultural factors, they are poorly understood. Reports from around the world document ED in several non-Western countries. The importance of studying ED in different cultural context lies in the insights that can be gleaned from a shift of perspective. This has implications for both diagnosis and treatment of ED universally.

Regarding diagnosis, we see the role played by lack of both professional and lay awareness of ED in Singapore. There are also the recent questions regarding the role of the thin ideal in the diagnosis of AN. Culturally valid testing instruments do not yet exist. Certain items on the Eating Attitudes Test, a commonly used battery to assess disordered eating attitudes and behaviors, were shown in one study to be misconstrued even by bilingual Chinese undergraduates. Also important to consider are atypical presentations or language used to describe ED symptomatology, secondary to both lack of awareness and fear of stigmatization. The development of ED in psychologically vulnerable individuals is tempered, in all cases, by its cultural context.

Furthermore, treatment currently combines behavioral and cognitive approaches which are influenced by the assumption that body image is central to the eating disorders. The chronicity of eating disorders for most patients and significant morbidity mandate improvement of current treatment protocols. A better understanding of cross-cultural factors in eating disorders would enhance treatment both in non-Western countries and in minority cultural groups in this country. In addition, such data would assist in the development of screening and prevention programs. Health care providers, particularly in primary care settings, should be alert to both atypical presentations of ED in their multicultural patient populations as well as classic presentations in non-classic patients.

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References

1. Ong YL, Tsoi WF, Cheah JS. A clinical and psychosocial study of seven cases of anorexia nervosa in Singapore. *Singapore Med J* 1982;23(5):255-61.
2. Hsu LG, Lee S. Is weight phobia always necessary for a diagnosis of anorexia nervosa? *Am J Psych* 1993; 150(10):1466-71.
3. Shiue L. *The Sociocultural Context of Eating Disorders in Singapore.* Unpublished undergraduate honors thesis, Brown University. 1993; Providence, RI.
4. Lee S, Ho TP, Hsu, LKG. Fat phobic anorexia nervosa - A comparative study of 70 Chinese patients in Hong Kong. *Psychol Med* 1993;23:437-451

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Physician, Protect Thyself: Minimizing the Risk of Employee Embezzlement

Richard Streitfeld, CFE, CPA

It is the course they don't teach in medical school: how to keep your hard-earned cash from walking out the door into your employees' pockets. But it couldn't happen here, you say. Well, informal surveys indicate that anywhere from 25 to 50% of all physician offices may be victims of embezzlement.[1]

* Doctor A lost more than $30,000. The likely culprit: his former administrative assistant, who skimmed a little bit of cash out of nearly every deposit for two years. Amount recovered: $10,000, from insurance. No prosecution.
* Doctor B wasn't so lucky. He lost at least $50,000. It is not difficult when you write the checks for payroll taxes to "cash." The employee is in jail, but the doctor hasn't recovered any cash yet.
* Doctor C sent her bookkeeper's son to private school on the "garnishments." She estimates her losses to be at least $100,000. The bookkeeper eventually confessed that money mysteriously seemed to "end up" in his wallet (but never to mysteriously "reappear" in the company accounts.) He confessed to $50,000; the doctor's seen $640 so far.

Unfortunately, physicians are more vulnerable to employee theft than most small business owners.

Unfortunately, physicians are more vulnerable to employee theft than most small business owners. Why?

* You are always, always, always busy with patients - or with insurance forms. The last thing you have time to do is verify last month's bank statement.
* You are often averse to this "numbers stuff." If you had wanted a business, you would have gotten an MBA, not an MD.
* A medical practice is cash-rich: a few co-pays a day will add up.
* Employees may assume that you won't even notice.
* Finally, you may feel safe.

My employees are exceedingly loyal. I can't imagine one of them stealing from me.

Exactly.

Embezzlement is defined as the fraudulent appropriation of property by a person to whom it has been entrusted, or into whose hands it has lawfully come. The deceived (you) must have confidence in the employee for the embezzler to gain access and authority. And for the embezzler to be confident about not being caught. It is the "golden rule" of fraud: It is your most trusted employees who will steal from you.

* Dr. C's bookkeeper was a patient of many years whom she had nursed back to health after a chronic illness. Dr. C would never suspect him. The patient/bookkeeper was so grateful he would come early, stay late, and not even charge the doctor (well, not directly).

I screen my employees carefully. And we have weekly staff meetings, a harmonious atmosphere.

Good start. But you're still at risk.

It doesn't hurt to get a criminal background check - just ask Dr. B, whose employee was up on similar charges at the same time she went to work for him. Paying attention to your employees' needs and establishing a positive work environment is also crucial. But even employees with "clean" records and nary an unkind word to say about their bosses may embezzle, given motive and opportunity. The motives run the gamut from supporting a gambling habit, to buying luxury cars, to paying emergency medical bills. Often the employee justifies the stealing the first time by thinking of it as a "loan." But then the borrowing becomes addictive.

* Doctor C's bookkeeper continued the stealing even after an investigation began. It had become part of his regular income.

I have employee dishonesty insurance. Won't that limit my risk?

Yes. And counting on insurance to cover your losses is like expecting the IRS to refund you all the deductions you missed.

It is advisable to purchase employee dishonesty insurance (also called a "fidelity bond"), which is inexpensive and covers a multitude of perils, including embezzlement and forgery. But insurance companies may exploit any weakness in your proof in order to deny the claim.

Wouldn't I just know if something big were amiss?

Insider thieves steal in small doses.

You would likely notice a ten thousand-dollar discrepancy in one month, even without really paying attention. But embezzlers typically spread their crime over months and years, both to feed their constant need as well as to avoid detection.

What can I do to strengthen my controls?

Segregate and rotate duties:

* Have daily cash receipts double-counted.
* Arrange to have the bank statement sent to your home and have someone other than the bookkeeper reconcile it.
* Make sure the financial people take vacations of at least one week every year and that someone does their job in their absence.
* If possible, rotate financial job responsibilities.

These procedures will reveal discrepancies and deter potential fraud. Dr. C's bookkeeper never took vacations except when the office was closed. Dr. B's wrote and signed checks and received all the financial mail, including the overdue notices from the IRS for the payroll taxes she was depositing - to her own account.

Institute a clear system of authorizations and verifications:

* Do you match your appointment book to the day sheet? In Dr. C's case, most of the money recorded on the day sheet was deposited. But the bookkeeper intentionally neglected to record many of the cash customers on to the day sheet itself.
* Do you break down the amounts on the day sheet into cash, check, and credit card? And then match the deposit to those amounts? Time and time again, this basic double-check is not present. Not only does it hinder the detection of fraud; it makes prosecution more problematic. Dr. C became suspicious when her bookkeeper balked at implementing this procedure.
* Do you have a purchase order or voucher system to approve all expenditures in writing?

Make sure records are organized and secure.

* Could you yourself find a bill or deposit ticket easily?
* Do you have computer back-ups?
* Do you have a safe for cash?

Disorganization works to the benefit of the perpetrator.

Our system of justice, fortunately, assumes innocence until proven guilty. But this puts the burden of proof on you. The State Police balked at Dr. A's case because cash receipt records were missing for two days out of the year. Then his insurance company challenged him when he couldn't pinpoint the culprit's vacation days. Dr. C asked his bookkeeper for deposit slips from the prior year, only to find out they had "suddenly disappeared." He eventually asked the bank to reissue them; this is neither a fast nor free service.

FRAUD FACTS[3]

- Fraud and abuse costs U.S. organizations more than $400 billion annually.
- Surveys indicate that 30% of otherwise honest employees will steal if given the opportunity.
- The most costly abuses, per capita, occurred in organizations with fewer than 100 employees.
- The average organization loses about 6% of its total annual revenue to fraud and abuse committed by its own employees.

If I institute these procedures, won't my employees feel I'm being too formal, impersonal?

Requiring clear documentation of financial transactions and providing clear lines of authority and responsibility protects the honest employees.

It may be uncomfortable to institute procedures with the employees you trust, but that is exactly the point. Remember — it is precisely the people you trust the most that will steal from you, because they have access and authority. You don't need procedures for the people you don't trust — you will make sure they don't have the opportunity to steal.

Stress to your employees that having a set of procedures that everyone follows in the same way promotes efficiency and prevents confusion. Consider your employees' workloads and distribute responsibilities accordingly. Tailor the procedures to your specific situation. Help out where you can.

How can I do that?

Stay involved.

* Understand the procedures and monitor their implementation ("show the flag" with surprise cash counts, etc.).
* Be responsive to your employees' feedback on the procedures.
* Analyze financial statements and investigate unusual items and unexplained trends (e.g. accounts receivable fluctuate wildly.)
* Be alert to changes in employees' behavior and lifestyle. The South Boston clerk who stole over $600,000 from a curtain manufacturer drove four late-model cars.[2]
* Play by the same rules. How often do you "raid" the petty cash box and not bring back a receipt?

Failure to institute controls can have disastrous consequences. Side effects of embezzlement can include your anger and disappointment, even insomnia and illness. The co-workers left behind will be confused and demoralized. Meanwhile, you will be spending your time (and more money) with accountants and lawyers to determine how much you've lost, and how to gain restitution and bring the perpetrator to justice.

Acknowledgement

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References

1. *Physician's Financial News*, PFN Publishing Company, Inc., December 15, 1995.
2. *The Boston Globe*, September 12, 1991.
3. Association of Certified Fraud Examiners; *Report to the Nation on Occupational Fraud and Abuse;* 1996.

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Lightning

by Gary C. Pien, ScB

Lightning. Blinding flash.
One...two...three...four...
Thunder rolled through the evening sky,
washed through the window I looked out upon,
and into me. No rain, not yet.

Lightning again. Three forks.
One...two...three...Thunder
rolled closer behind the afterimage, this time.
The storm was approaching, drawn by the
beacon.

"Doctor?"
His words left a bitter echo in my ears.
I wasn't a doctor, yet, but he insisted.
Thunder, loud, whipping fiercely through the
shaking floor.
"Doc, I think itís time."

And so, drawing in a last reluctant breath I
turned,
following the son into the adjacent room.
And there on the bed she was,
eyes fixed upon something in the distance, out of
sight.

There were no gadgets in her, now.
There was no need anymore, or rather, no reason.
I walked up and gathered her hand in mine.
"I'm here."

She cocked her head slowly. So slowly.
"Thank you...for staying."
I nodded, at a loss for words.
But words were not what she wanted.

She knew and smiled but once more,
interrupted by a cough, coughing and coughed.
Lightning.
Suddenly she clenched the sheets, racked with
pain,
and my hands were caught in her iron grasp.
Thunder.

"It's coming! Oh GOD it's coming!" she cried.
Her last sound, the release of her last mortal
breath
carried across her philtrum, breaking the seal
which locked the secrets of life, always known
but hidden once born.

The son cried, and I sobbed
the tears of a stranger, falling upon her arm.
Outside, the clouds broke and the rain began in
earnest.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Alcohol Involvement in Motor Vehicle Fatalities, 1995

Jay S. Buechner, PhD, Elizabeth A. Laposata, MD, and Nancy R. Haley, MS

In 1995, 73 deaths from motor vehicle crashes (including multiple-vehicle and single-vehicle crashes and motor vehicles striking pedestrians, bicyclists, etc.) occurred in Rhode Island. Although the number of such deaths has decreased substantially from the 143 recorded in 1988, motor vehicle fatalities still account for more years of life lost before age 65 than any other category of injuries, including suicides, homicides, falls, drownings, fires, and other unintentional injuries. Furthermore, many motor vehicle fatalities, and presumably non-fatal injuries, are associated with the abuse of alcohol and, to a lesser extent, drugs. These fatalities and injuries are considered largely preventable, and one of the state's Healthy Rhode Islanders 2000 objectives is to "reduce alcohol and other drug related health problems by reducing deaths caused by alcohol-related motor vehicle crashes by at least 20% to 4.5 per 100,000 people."[1]

Methods

Motor vehicle fatalities occurring in Rhode Island were selected from the preliminary vital records data file of death certificates for 1995, based on underlying cause of death. This data file does not include deaths of Rhode Island residents occurring out of state and is subject to change. All selected deaths had been referred to the Office of State Medical Examiners for investigation; for 65 of the 73 cases, antemortem and/or postmortem blood samples had been screened for toxicological evidence of selected substances, including alcohol, poisons, illicit drugs, prescription drugs, and over-the-counter drugs. For purposes of analysis, toxicological reports from the Department of Health's Forensic Toxicology Laboratory were linked to death records through the Medical Examiner case number.

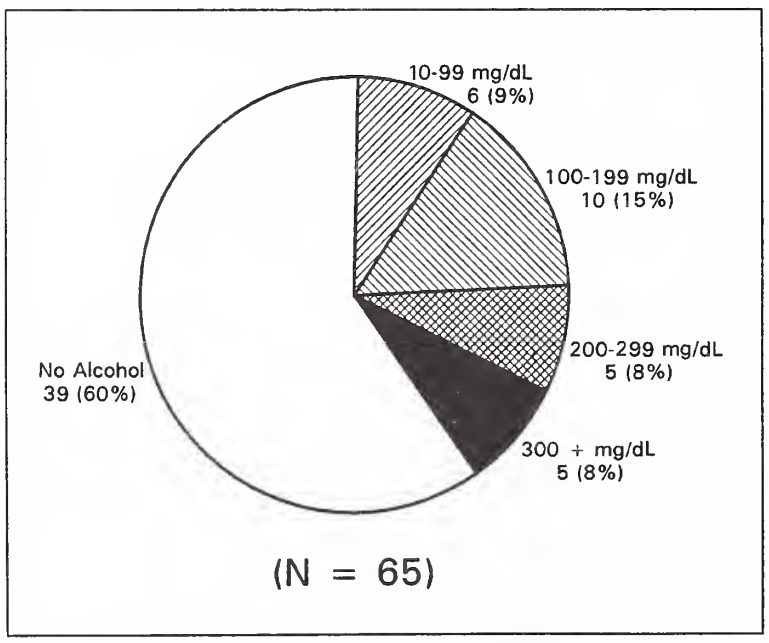

Figure 1. Blood Alcohol Concentration among Motor Vehicle Fatalities in Rhode Island, 1995.

Results

Of the 65 motor vehicle fatalities for which toxicological screens were performed, evidence of alcohol was found for 26 persons (40%) and evidence of drugs was found for 6 persons (9%). As there were three cases in which both drugs and alcohol were found, the total number of fatalities where substance use was found was 29 (45%). Of the six cases that were positive for drugs, four involved prescription drugs and two involved cocaine.

Among decedents with alcohol, the level of blood alcohol varied from a low of 12 mg/dL to a high of 365 mg/dL. (The detection limit for alcohol is 10 mg/dL.) The large majority, 20 of 26 cases, were legally intoxicated at the time of death (alcohol concentration of 100 mg/dL or greater). A substantial number of decedents had blood alcohol levels that were over twice the legal definition of intoxication. (Figure 1)

Positive blood alcohol results were found among decedents in all age groups from adolescents to the elderly. The proportion of cases where alcohol was found peaked at 65% among those ages 25 to 44 years and was lowest among older decedents. (Figure 2) Nearly all persons (9 out of 10) with blood alcohol levels above 200 mg/dL were in the age group from 25 to 44 years, and 8 of the ten were males. Overall, males were more likely to be positive for alcohol (23 of 46 cases, or 50%) than females (3 of 19 cases, or 16%).

Alcohol was found in decedents who were drivers, passengers, motorcyclists, and pedestrians. (Figure 3) Except for motorcyclists, for which the numbers were small (3 positive findings among 5 decedents), the percentage of persons with alcohol was similar in all of the groups. Positive findings for drivers and pedestrians suggest the involvement of alcohol in the fatality; for passengers, the relationship between alcohol use and cause of death is less straightforward.

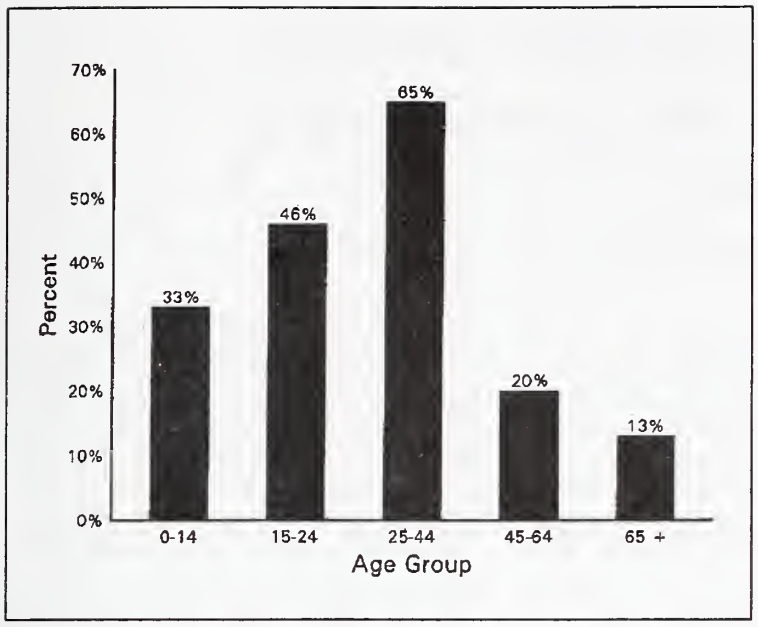

Figure 2. Percentage of Motor Vehicle Fatalities in Rhode Island Positive for Alcohol Use, by Age Group, 1995.

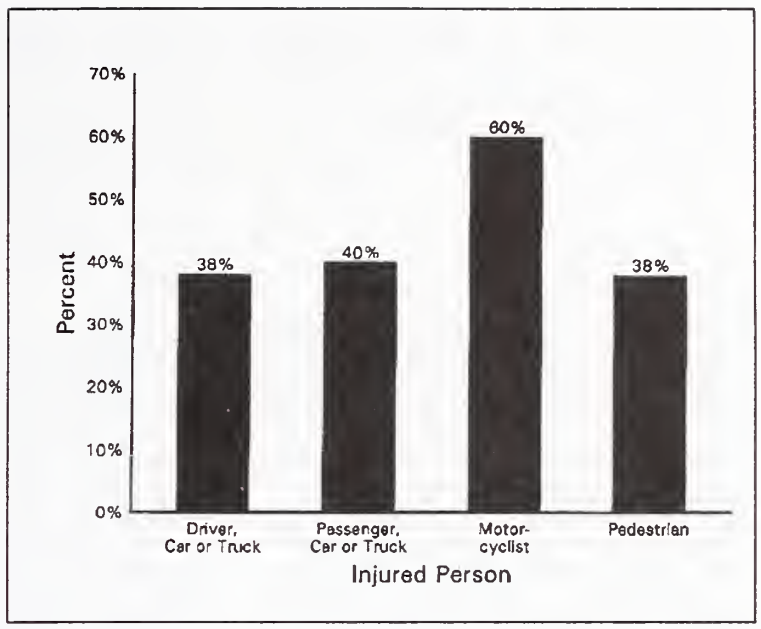

Figure 3. Percentage of Motor Vehicle Fatalities in Rhode Island Positive for Alcohol Use, by Injured Person, 1995.

Discussion

The number of motor vehicle fatalities in Rhode Island fell by nearly half over the seven years from 1988 to 1995. During this period, substantial advances have been made in the passive restraint devices installed in automobiles, notably the increasing prevalence of airbags, and the state has passed a mandatory safety belt law. The percentage of Rhode Island adults who report using their safety belts "always" or "almost always" has risen from 53% to 66%.[2] However, the percentage of adults who reported that they had driven after having had too much to drink on one or more occasions during the past month fluctuated between 2.6% and 3.2% during the period from 1988 through 1993 before rising to 3.6% in 1995.[2] Among males ages 25 to 44 years the rate in 1995 was 7.3%.

Clearly, there is opportunity for further reduction of motor vehicle fatalities in Rhode Island. Despite improvement, the state's rate for safety belt use is lower than the rate for every other state except Maine. In Hawaii, 95% of adults report using safety belts, and in California the rate is 94%. Rhode Island's rate for drinking and driving is also substantially higher than the median among states (2.3% in 1995). Improvement in these areas of health-related behavior will bring concomitant decreases in motor vehicle injuries and fatalities.

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References

1. Rhode Island Department of Health. *Healthy Rhode Islanders 2000.* Providence, RI. December 1993.
2. Data from the Behavioral Risk Factor Surveillance System. Office of Health Statistics, Rhode Island Department of Health.

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Point of View: An Australian Apology
Health and Society in Aboriginal Australia

Peter Chin-Hong, MD

The old man sitting next to me in the hut on the river bank suddenly turned to me. "Here's something for you," he said, thrusting the well worn, read, and reread, newspaper into my hands. "Governor-General urges action on Aboriginal health" headlined the daily. The lead story followed with dramatic statistics. Aborigines were six to eight times more likely to die than non-Aboriginal people between ages 25 and 55. Indigenous people had a life expectancy of just over 60 years, 15-20 fewer years than the Australian non-Aboriginals. Indigenous babies were up to four times more likely to die at birth. The report continued with more "mores": poorer houses, more overcrowding, more smoking, more lifetime hospital admissions.

I was in Australia, not some underdeveloped outpost in the middle of the ocean, as the statistics would imply. And my newspaper was dated April 3, 1997. But even though I often felt isolated in this desert outback town, and even though I was often astonished at the high levels of unemployment and dramatic alcohol-related bashings at the local pubs, I was still somewhat surprised to see the report issued by the Australian Bureau of Statistics and the Australian Institute of Health and Welfare, cited in *The Australian.* It almost seemed from the report that there was little if any health care offered to Australia's indigenous peoples.

But in my small Aboriginal town of 1000 on the banks of the Darling River, the local clinic appeared well equipped. This was no gleaming tertiary care facility, but there were skilled nurses, ample supplies and a well stocked pharmacy with free medications dispensed to patients. There was an EKG machine, pulse oximetry could be obtained and supplemental oxygen was available. There were no permanent physicians in town, but the Royal Flying Doctor Service visited at least four times a week for primary care clinics, and more if emergency evacuations to the base hospital were necessary. With every patient whom we saw in the absence of a physician, we did remote consultation via telephone with a Flying Doctor at the base. There were visiting specialty services. Psychiatric services visited at least once a week. There were resident social workers. Community Health nurses did primary care services at people's houses. Aboriginal Health workers were members of the community who acted as liaisons between the community and the clinic and were specially trained in basic medical knowledge - altogether a seemingly comprehensive health system. Then why the disparity between the hardware and the health outcome statistics?

Abbreviations Used:

ATSIC	Aboriginal and Torres Strain Islander Commission
EKG	Electrocardiogram
NSW	New South Wales

The answers were not immediately apparent. Were there barriers to health care access in the community? I interviewed several members of the staff as well as members of the community. Generally people were satisfied with the clinic. People agreed that the Aboriginal Health workers were invaluable, and were partly responsible for increasing people's utilization of hospital services. Some did report a need for more "black faces" in the health system. Aboriginal Health workers generally thought that there was a good relationship between the community and the hospital, and with few exceptions, staff were sensitive to patients' needs.

What was driving these statistics was perhaps the legacy of the past. Aborigines today make up about 2% of Australia's population of 18 million and had lived there for at least 40,000 years before the white British settlers came in 1788. From the start, the invaders did not attempt to negotiate treaties or recognize land rights. It was not until 1967 that a referendum giving the Federal Government power to set Aboriginal policy was passed. Only then were Aborigines counted in the census and granted citizenship.

Stuart Rintoul, in *The Wailing - A National Black Oral History,* described 1988, the bicentennial of white Australian settlement: "For black Australia, it was a year of mourning... While white Australians celebrated 'settlement', indigenous people celebrated their survival and mourned the loss of their land and traditional way of life, the murder of their ancestors with bullets and poisoned flour, their rape and abuse, their imprisonment in their own land ..."[1] The reasons behind the poor health indicators in Aboriginal Australians are no doubt complex. Many believe that such a systematic destruction of the people via land disenfranchisement, cultural detachment and continued racial prejudice and stereotyping, not surprisingly, lead to poor health outcomes.

One has only to read about the history of the settlement of Wilcannia, my home for the two months I spent in the Australian outback, to begin to understand what sort of "systematic destruction" took place. This history of the Barkindji or Darling River people, described as "one of unmitigated tragedy,"[2] traces the forced migration of a people from the banks of the Darling River.

White explorers first entered the area in 1829. Initially bearing gifts, the early explorers were quick to counteract with bullets when the Aborigines resisted the whites' efforts to claim the land. Eventually the early settlers set up stations with sheep and cattle grazing. Local Aborigines worked as shearers and station hands in exchange for pittances of blankets, flour, tea and sugar. By the 1890s, a drought led to closer settlements and overstocking of animals in the face of an economic recession. There was less land for the Aborigines to hunt on and there was little support from the station owners. The Aborigines were forced onto reserves where they were given handouts by the Protection Board of New South Wales (NSW), first near an old burial site at Menindee. In 1934, 'drylanders', members of another tribe who had little in common with the river people, were suddenly moved in with them. In 1948, without warning, the whole settlement was moved to Murrin Bridge, 200 miles to the east, and far from the Darling River. Finally, with many of the unhappy river tribesmen returning to camp on the river banks, a settlement was built for them in Wilcannia in 1952.

The unpredictable population movements, particularly the enforced linkages of unrelated tribes, may have led to the destruction of most of the language of the original Barkindji people. As one of the Aboriginal Health workers revealed: "We're one of the sorry tribes, we lost most of our language you know... I wish I knew how to speak the language. We're just one of the sorry tribes..." None of the people I interviewed knew their original tongue, and although a dictionary of the language had been compiled, and some words were now being taught in the local schools, no one from the community could be identified as fluent.

Does loss of language translate into loss of culture? One non-Aboriginal health provider had this to say about culture in the community: "If there is a really big crisis for them, culture plays an enormous part. The clanning... When people are hurt, they will look to their culture... it's like Christians with God. A lot of people tell me that there is no culture in this town. But it hasn't gone at all. It's there. It's just that it isn't utilized to the fullest extent." An Aboriginal nurse was more pessimistic: "A lot of the traditional family values have diminished where once traditionally men had a role as the hunter and women gathered. All of that is gone. People are relying on welfare then feeling down in the dumps and feeling a bit depressed. They haven't got any work so they don't feel like they have a role anymore... A lot of things that were very precious to Aboriginal people are lost, so a lot of them aren't feeling good about themselves." While many of the traditional ceremonies that I had studied in preparation for my trip seemed nonexistent, I was nevertheless impressed to see that the Aboriginals in the community still had a very strong sense of identity.

Many believe that a systematic destruction of the people via land disenfranchisement, cultural detachment and continued racial prejudice and stereotyping, not surprisingly, lead to poor health outcomes.

With a spate of recent research papers, documentaries, newspaper articles and books dealing with the Aboriginal-Australian encounter, it seems that the Aboriginal experience is at the core of the Australian conscience today. Two years ago, in what was called an apology to the world by the *Sydney Morning Herald,* the then Prime Minister of Australia, Paul Keating, chose the World Summit for Social Development in Copenhagen to admit that the Australian Aborigines were living in deplorable standards of health. There is now a firm, focused commitment by the government to Aboriginal health. Two years ago the federal government took over responsibility for the policy and financial running of 90 community-run Aboriginal health centers from the Aboriginal and Torres Strait Islander Commission (ATSIC). Altogether, an extra A$204 million was slated to be pumped into health and housing over the next four years.

But improvements in health and housing may get at only part of the picture. A new hospital slated to be built in Wilcannia would be certainly welcomed by the community, but could have a more significant impact on health outcomes if coupled with employment and sustainable development. All my interviewees linked the lack of employment to the high levels of alcoholism, domestic violence and low self-esteem in town. As another health care provider in Wilcannia declared: "Health is more than just doctors and nurses. Health is self-esteem. (Low) self-esteem...leads to unemployment, drunkenness... all the problems of not believing in yourself...I don't think that the hospital has a great deal to do with health. It all comes back to self-esteem, living conditions... I think that the hospital plays only a minor role." Maybe the Governor-General still has a thing or two to think about.

References

1. Rintoul S. *The Wailing - A National Black Oral History.* WHA, 1994:4.
2. Hercus L. *The Paakantji Language.* Australian National University, 1982:1.

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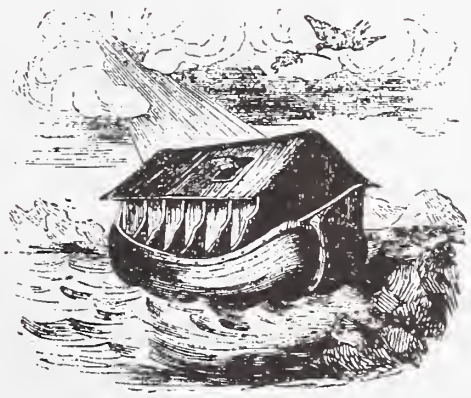

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Health Promotion, Legislation, and Physician Advocacy

Megan Werner, AB

Legislation is an important health promotion strategy. Although many health promotion goals cannot be "legislated," some, like safety belt use, helmet use, smoke detector use, and tobacco taxes, can be. The regulations, local policies, and enforcement activities which cascade from one piece of thoughtful legislation may impact entire industries, communities, or states at once.

Nonetheless, translating health promotion policy into law is an arduous process. Despite the best efforts of supporters, many proposed health promotion bills never become law. Organized opposition to health promotion legislation, typically using "individual rights" as its theme, may be noisy, stiff, and effective. Enter physician advocates.

Physicians have proven their worth as legislative advocates throughout a long history with local, regional, and national legislative bodies. Physician advocates speak with great authority about the causes of illness and injury, the importance of health promotion goals, and, most importantly, the consequences of not achieving them. Legislators, in fact, have come to expect physician testimony on significant health legislation. In short, because physician participation may be critical to the passage of health promotion legislation, physicians are important members of any advocacy team.

Accomplishments of special note for their effectiveness in saving lives and the magnitude of their impact on the public's health include laws requiring safety belt use, laws requiring helmet use (for motorcyclists and bicyclists), laws requiring the installation of smoke detectors, and laws raising tobacco taxes. Laws requiring safety belt and helmet use and laws requiring the installation of smoke detectors have contributed significantly to decreases in the number of injury deaths in our country. Laws raising tobacco taxes have contributed significantly to decreases in cigarette consumption and in the number of current smokers.

Safety Belts

Safety belt laws work. Safety belt laws passed between 1984 and 1990 in the U.S. have increased the usage of safety belts among automobile occupants in the front seat from about 10% to almost 50% by 1990, with usage estimates ranging as high as 80% for some areas.[1] By 1993, after 43 states and the District of Columbia passed laws requiring the use of safety belts, the national usage rate had risen to 62%.[2] It has been estimated that using safety belts in automobiles reduces the risk of death by 43% and the risk of serious injury by between 43% and 52%, making safety belt use the most effective intervention in the prevention of death and injury from motor vehicle crashes.[2] In 1990, safety belt use was estimated to have prevented 4800 deaths and 120,000 serious injuries among front seat occupants throughout the U.S. Locally, the higher the rate of safety belt use, the more injuries and deaths are prevented.[1]

Helmets

Helmet laws work, too. Helmet laws have played a significant role in decreasing the number of head injuries and deaths resulting from motorcycle[3,4] and bicycle crashes.[5,6] States with motorcycle helmet laws report far fewer head injuries and related deaths from motorcycle crashes than states without laws. Also, states with comprehensive laws (laws that require every rider to wear a helmet, regardless of age) report fewer head injuries and related deaths than states with partial laws (laws which only require riders of a certain age to wear helmets, or are restricted only to passengers or drivers). Furthermore, when states change their helmet laws to make them stricter, the number of deaths from motorcycle crashes decrease; but when states change their helmet laws to make them more lenient (abolish them or change them from comprehensive laws to partial laws), the number of head injuries and associated deaths increase.[7] Finally, it has been demonstrated that although partial helmet laws are better than no helmet laws, they are far less effective in preventing head injuries and fatalities than are comprehensive helmet laws.

Smoke Detectors

Smoke detectors save lives, and laws requiring their installation have contributed substantially to their widespread use. Legislation mandating the installation of smoke detectors has been shown to increase the use of residential smoke detectors in both new and existing residences. Because smoke detectors often provide the first warning of a fire, functional detectors can reduce the risk of fire-related injury or death by more than 50%.[8] Only 10% of the 1,000 children under age 14 who die in residential fires each year die in homes with working smoke detectors.[9] As the number of homes with working smoke detectors increases, the

risk of death from residential fires decreases significantly.[10]

Tobacco Taxes

Increases in cigarette taxes across the United States have been shown to be associated with substantial decreases in cigarette consumption. One review of cigarette sales throughout the United States showed that sales decreased by an average of 2.4% following various increases in state and federal excise taxes on cigarettes, and that a clear dose-response effect prevailed: the decrease in sales was greater when the tax increase was greater. This well-known, direct relationship between cost and consumption has been demonstrated in other countries as well.[12]

Increases in cigarette taxes may also depress consumption indirectly, if the new tax revenues are used to fund other health promotion activities. The California experience is a case in point. California increased its cigarette tax 25 cents in 1989 under the voter-initiated legislation Proposition 99,[13-15] and used the new tax revenues to sponsor a community-wide mass media program designed to reduce the prevalence of smoking. In the first four years of the California program, the prevalence of adult cigarette smokers fell from 26.7% (in 1988, before the tax increase) to 22.2% (in 1992). Massachusetts is attempting to replicate the California experience, and thus far has demonstrated promising results.

Caveats

Legislation may be used to encourage healthy behaviors if it delivers effective incentives and disincentives. Its ability to do so depends upon the context in which it is implemented. Incentives and disincentives must be strong enough to work without violating established societal norms. They must be applied consistently and comprehensively to achieve a measurable population effect. In sum, legislation is not the "magic bullet" of health promotion. It is one of a number of health promotion strategies which may have practical health effects if selected and implemented appropriately for the task at hand.

Recently in Rhode Island ...

Over the past 15 years in Rhode Island, physician advocates have played an important role in the development of effective health promotion laws. The use of child passenger restraints and safety belts in motor vehicles is now mandatory. Rhode Island's child passenger restraint laws are among the most effective in the country. (Adult safety belt laws need strengthening!) The use of helmets is mandatory for all motorcycle passengers, all motorcycle operators under 21 years of age, and bicyclists through the age of eight. Smoke detectors are required in all new residences and in all existing residences before they can be sold. Tobacco taxes have been raised steadily over the past decade. Smoking is prohibited in schools and many public places, and all workplaces must have smoking policies which protect the "atmospheric environment" of the non-smoker. Enforcement policies for preventing the sale of tobacco to children are in place. Basic infrastructure for addressing family and intimate violence has been developed.

As a result, the proper use of child passenger restraints and safety belts in motor vehicles has increased substantially. Helmet use among motorcycle passengers is almost universal. Many more children are wearing effective headgear when they bicycle. Smoke detectors are commonplace. Fewer adults smoke. Smoke-free indoor air has become the norm in many schools, workplaces, and public places. Many tobacco vending machines are inaccessible to children. Vendors who sell tobacco to children have been cited for violations.

Thank You!

The Rhode Island Department of Health would like to take this opportunity to express its sincere thanks to the many physicians who have contributed unselfishly to the prevention of injury and disease through the promotion of healthy behaviors, and we look forward to strong physician support of health promotion legislation in the future!

References

1. Michael J, Nichol J. Increased safety-belt use, United States, 1991. *MMWR* 1992;41:421-423.
2. Peterson TD. Public health focus: Impact of safety-belt use on motor vehicle injuries and costs - Iowa, 1987-1988. *MMWR* 1993;42:704-706.
3. The Effect of 1992 California motorcycle helmet use law on motorcycle crash fatalities and injuries. *JAMA* 1994;272:1506-1511.
4. Muelleman RL, Mlinek EJ, Collicott PE. Motorcycle crash injuries and costs: Effect of a reenacted comprehensive helmet use law. *Annals of Emer Med* 1992;21:266-272.
5. Cote TR, Sacks JJ, Lambert-Huber DA, et al. Bicycle helmet use among Maryland children: Effect of legislation and education. *Pediatrics* 1992;89:1216-1220.
6. Dannenberg AL, Gielen AC, Beilenson PL, et al. Bicycle helmet laws and educational campaigns: An evaluation of strategies to increase children's helmet use. *Am J Pub Health* 1993;83:667-674.
7. Sosin DM, Sacks JJ, Holmgreen P. Head injury-associated deaths from motorcycle crashes; Relationship to helmet-use laws. *JAMA* 1990;264: 2395-2399.
8. Reisinger KS. Smoke detectors: reducing deaths and injuries due to fire. *Pediatrics* 1980;65:718-724.
9. National SafeKids Campaign. Fireproof your home: because no child should die in a fire.
10. The National Committee for Injury Prevention and Control. Residential Injuries. *Injury Prevention: Meeting the Challenge.* New York, NY: Educational Development Center, 1989;145-176.
11. Peterson DE, Zeger SL, Remington PL, Anderson HA. The effect of state cigarette tax increases in cigarette sales, 1955-1988. *Am J Pub Health* 1992; 82:94-96.
12. Chapman S, Richardson J. Tobacco excise and declining tobacco consumption: The case of Papua, New Guinea. *Am J Pub Health* 1990;80:537-540.
13. Flewelling RL, Kenney E, Elder JP, et al. First-year impact of the 1989 California cigarette tax increase on cigarette consumption. *Am J Pub Health* 1992;82:94-96.
14. Hu T-W, Sung H-Y, Keeler TE. Reducing cigarette consumption in California: Tobacco taxes vs an anti-smoking media campaign. *Am J Pub Health* 1995;85:1218-1222.
15. Hu T-W, Bai J, Keeler TE, et al. The impact of California proposition 99, a major anti-smoking law, on cigarette consumption. *J Pub Health Policy* 1994:26-36.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	January 1997	12 Months Ending with January 1997	
	Number	Number	Rates
Live Births	888	13,619	13.8*
Deaths	1,000	9,851	9.9*
Infant Deaths	(5)	(72)	5.3#
Neonatal deaths	(4)	(54)	4.0#
Marriages	266	7,971	8.0*
Divorces	275	3,243	3.3*
Induced Terminations	535	5,524	405.6#
Spontaneous Fetal Deaths	28	933	68.5#
Under 20 weeks gestation	(21)	(867)	63.7#
20+ weeks gestation	(7)	(66)	4.8#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	July 1996	12 Months Ending with July 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	218	3,204	323.6	4,366.0
Malignant Neoplasms	205	2,563	258.8	7,264.0
Cerebrovascular Diseases	39	585	59.1	726.5
Injuries (Accident/Suicide/Homicide)	29	337	34.0	6,146.5**
COPD	23	357	36.1	267.5

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

William S. Halsted and Rubber Gloves

In this anecdote, the motivation for a major contribution to operative surgery changes stems from an amatory interest rather than one driven by a primary commitment to science.

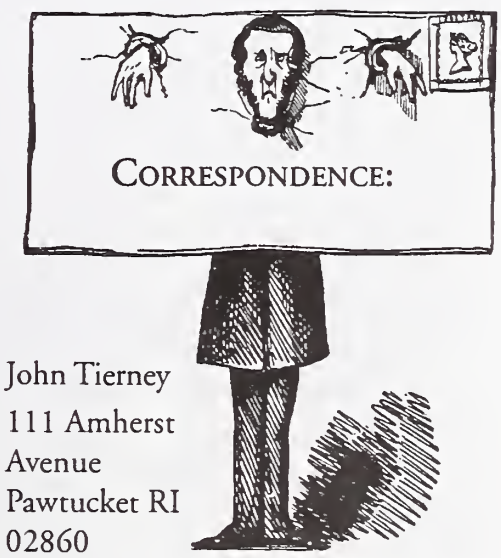
The story involves William Stewart Halsted, MD, (1852-1922) [Transkei, 1985, #112] one of the most distinguished and innovative of American surgeons. He received his MD degree from Columbia University and was a leading surgeon in New York City hospitals from 1880 to 1888. He was then one of four great physicians who founded Johns Hopkins Hospital and Medical School. During his full life, he was responsible for the establishment of numerous operative procedures including aneurymal repair and radical mastectomy for cancer. He also pioneered the use of cocaine [and other agents] for topical and regional anesthesia.

In 1890, Dr. Halsted was dating the Chief Operating Room nurse at Johns Hopkins Hospital, a Miss Carol Hampton. The standard operating room procedures at that time, influenced greatly by the antiseptic techniques of Lister and Semmelweis, required that the hands of those involved in surgical intervention be thoroughly scrubbed with antibacterial solutions. These solutions resulted in a severe contact dermatitis with Miss Hampton's hands, causing them to become red, rough and unsightly.

It occurred to Dr. Halsted that the hands of the operating room personnel might be protected by rubber gloves which could be more easily sterilized than hands, but only if these gloves were made sufficiently thin so that they would not interefere with the dexterity required in surgical procedure; and further, if they did not diminish the sense of touch which surgeons needed.

In 1890 Dr. Halsted became the first surgeon of importance to wear rubber gloves during surgery; the innovation eventually was adopted throughout the profession. An Australian stamp honoring the World Medical Association Assembly portrays surgical rubber gloves.

The introduction of rubber gloves marked the transition from antiseptic surgery to aseptic surgery [ie, from the killing of germs in the operating room environment to the creation of barriers to pathogens.] Nurse Hampton's dermatitis, it was reported, cleared up, and she and William Halsted were married that same year. It would have made this story a more fascinating and romantic one if they had "lived happily after." In truth, however, when they retired from Johns Hopkins, they bought an estate in Virgina, where she lived on one floor and he on another.



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Ninety Years Ago

[July, 1907]

The lead editorial discusses - and strongly advocates - a new plan to supply clean milk for the infants of the Providence region. Distributing stations have been established at five convenient locations in the city. The milk is secured from a dairy farm in Seekonk and placed in sterile nursing bottles. Bacteriologic studies are periodically undertaken. The reader is reminded of the appropriate mixtures of milk, water, lime water and milk sugar, depending upon the age of the infant.

A second editorial discusses the great value of the newly devised opsonic index.

A third editorial notes the recent national meeting of physicians concerned with the recognition, treatment and prevention of tuberculosis, and reprints its most recent resolution urging compulsory notification and registration of tuberculosis patients by appropriate governmental agencies.

The lead article discusses the psychic factor in disease and is presented by Dr. George Carroll Smith of Boston. The author has a dim regard for the diagnosis of neurasthenia as well as the many therapies proposed for it. He analyzes 100 consecutive cases and divides them into two great classes: Those with an inherited disposition [children of parents with tuberculosis, alcoholism, syphilis or nervous dispositions]; and those with a healthy heritage but with bad environment or with superimposed economic problems. He concludes by outlining the requirements of physicians who would practice psychotherapy; preeminent of these is the need for a strong personality and the need to know his patient well.

V. Lee Fitzgerald, MD, discusses the treatment of diseases of the rectum and anus under local anesthesia. His paper includes the local surgical therapies for hemorrhoids, fistulae, abscesses and impactions. Local anesthesia is achieved using either eucaine, stovaine or cocaine. He illustrates his recommendations by discussing three cases in detail.

Fifty Years Ago

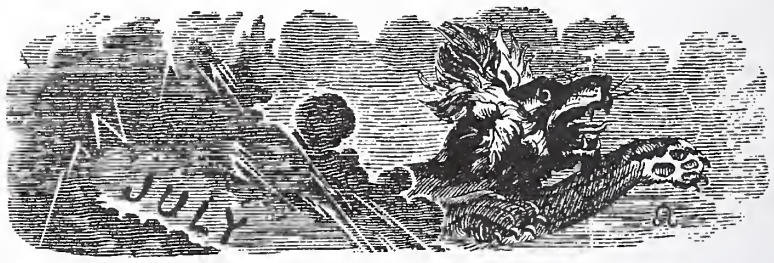
[July, 1947]

The use of estrogens and progesterone in clinical practice is summarized by Elmer L. Sevringhaus, MD. The author first discusses the fundamental chemistries of these hormonal agents and the means by which they are prepared as pharmaceuticals. After a brief excursion into pituitary-ovarian relationships, he then outlines the indications and contraindications for the use of these hormones. He concludes with a discussion of the normal hormonal control of menstruation and the possible basis for the toxemias of pregnancy.

Hannibal Hamlin, MD, discusses the history, the indications for and the merits of a procedure known as prefrontal lobotomy or leucotomy. He notes that it has been called "a measure of desperation." He quotes a colleague: "The crucial decision must be made in each case as to whether a portion of the brain possessing some of the noblest functions of the personality must be sacrificed in order to restore the individual to a more effective existence."

Occupational medicine and its relationship to present day industrial relations is outlined by C.F.Yeager, MD, of Connecticut.

Laurence A. Senseman, MD, summarizes the importance of comprehensive records in the hospital practice of neuropsychiatry.



Twenty Five Years Ago

[July, 1972]

Health planning in Rhode Island is discussed by John T. Tierney, former Assistant Director of the Rhode Island Department of Health. After a summarization of the Health Planning Council, Medicare, Medicaid, the Tri-State Regional Medical Program and SEARCH, including the history of these entities as well as their enabling legislations, the author concludes by stressing the importance of regional rather than national health planning as the best means of achieving a strong and responsive health care system in Rhode Island.

Arnold Porter, MD, as President of the Rhode Island Medical Society Physicians Service [Blue Shield], provides the readership with the organization's annual report.

Both Arthur F. Hanley, the Executive Director of Blue Shield, and Douglas J. MacIntosh, its Vice President, then review the accomplishments of the organization during the preceding year with particular reference to newer utilization review technics.

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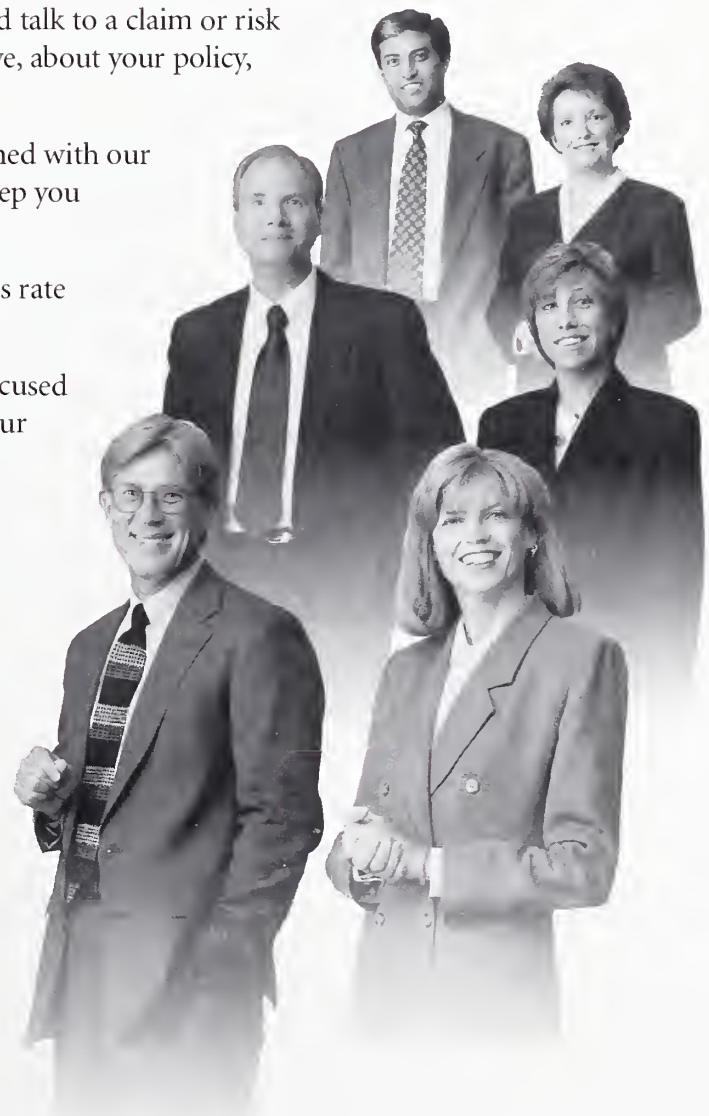

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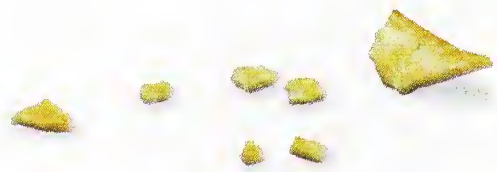

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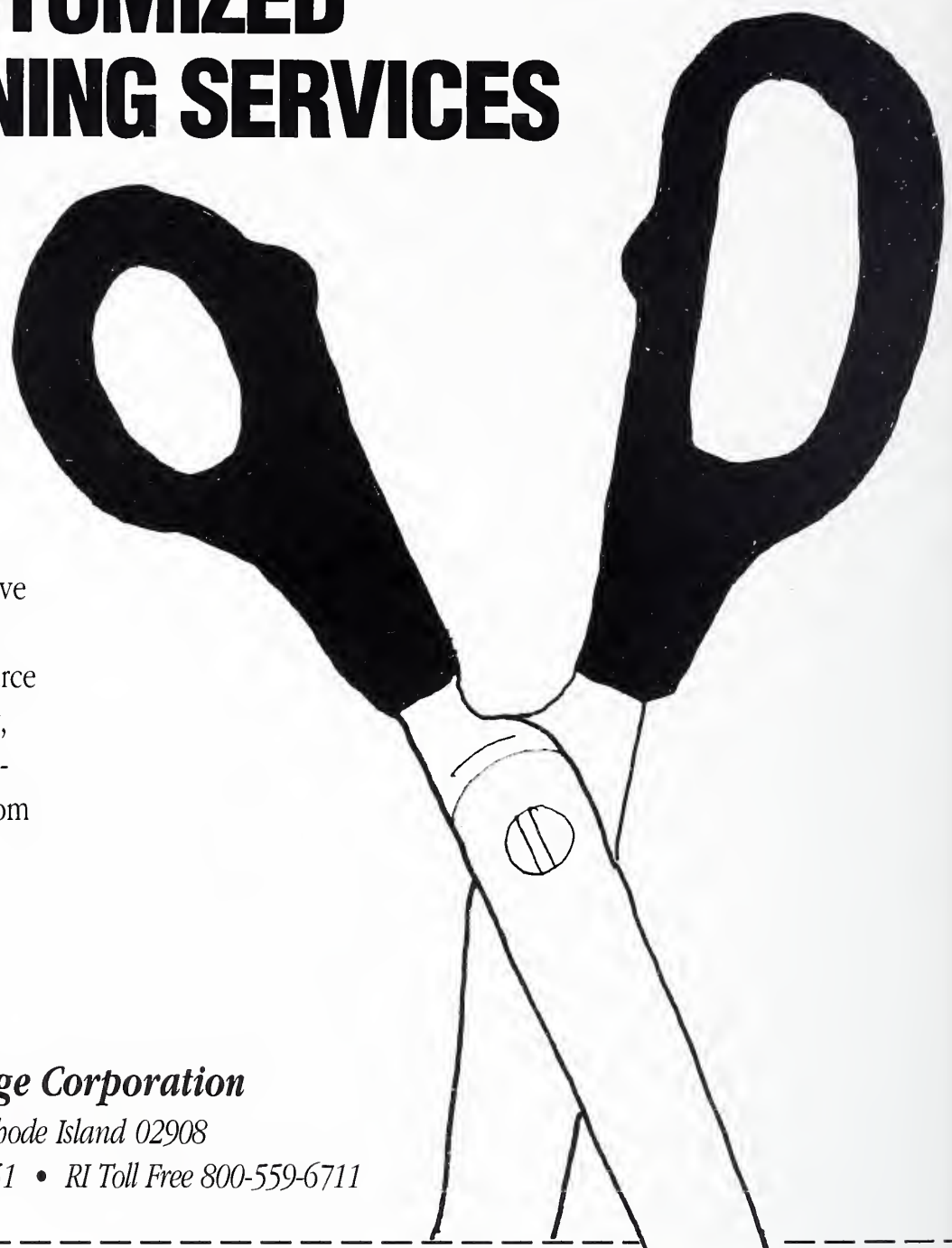

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COMMENTARIES

Medicine Behind Bars and Other Lessons from the AIDS Epidemic

When I first came to Brown, six weeks before starting work as an infectious disease doctor with a strong interest in HIV and AIDS, my boss, Charles Carpenter, asked how I'd like to work one morning a week in the Rhode Island state prison caring for persons with HIV. I swallowed once, and then I swallowed twice (it wasn't really my idea of academic medicine), but it's never a good idea to say no to your future boss before you've even tried it....so I said, "Sure...it sounds interesting."

My first few visits were daunting: high chain-link fence with razor-sharp wire, clanging gates, and guards not known for their genteel manner. I said a silent prayer as I walked in that first morning. It was frightening to see the loss of dignity among the inmates. Happily for me, the nurse in charge of the program was a wonderful person who showed me the ropes and kept me out of trouble. You'll find that this is the rule rather than the exception: if you're willing to trust the nurses with whom you work as colleagues and team members, not only will they keep you out of trouble, but they'll make you look brilliant to boot.

What I found on the other side of the prison walls..was...humanity. Soon I looked forward to my Thursday mornings "in prison" taking care of inmates with HIV. The inmates were grateful, engaging, had interesting medical problems, and shared stories of their lives both behind bars and in the community. Many of their lives were scarred by drug abuse; many had undergone years of sexual or physical abuse. Often the stories were tragic, sometimes comical, but routinely open, honest and straightforward. I had found what Osler called "the true poetry of human life" behind the walls of the prison. This is the poetry of those in need who are struggling with their loves and their joys, their sorrows, their griefs, and their pain. It's the poetry you'll encounter in emergency rooms, on hospital floors, in physicians' offices, but the starkness of prison made it all the more vivid.

The medical care in prison in and of itself was fascinating - treating HIV infection, preventing tuberculosis, vaccinating for hepatitis, and so on - but it was not technically different from work in the hospital.

What is different is that in prison, a physician provides so much more than filling out prescriptions and performing procedures. As important as the medications are, you can never underestimate the importance of the individual who administers them, and how they are administered. The prescription is only part of the treatment. Along with the medication, one is providing hope, compassion, and *care* for an individual who may have forgotten that anyone cared and that there was any hope and compassion left for them. This came through clearly to me two weeks before Christmas during my first year, when I went in on a regular Thursday morning to see patients with HIV in the women's prison. Waiting was a woman whom I had known and cared for at The Miriam Hospital. She was HIV positive but not acutely ill. She had been picked up on a three year-old warrant for a fine that she had never paid. She was awaiting a hearing, and because of her old record, which involved prior drug use, it looked as if she was going to be there for at least six weeks. Her mother was taking care of her two children, ages two and four, at home. It was clear as soon as I saw her that she was scared, isolated, ashamed, and hurt - she wouldn't be home for the holidays with her children. As soon as she saw me, her face lit up. The visit didn't take long - I could reassure her quickly that she would continue to receive her medications. Her HIV wasn't going to accelerate while she was in prison, but just as importantly, there was no condemnation (implicit or explicit) directed towards her that she was in jail - the focus of the medical visit was concern over how she was doing and how her mother and her children were holding up.

You may ask, "What in the world does this have to do with curing disease and treating illness? What does this have to do with prescribing life-saving medications?" With your white coat and the concern in your demeanor, you provide a dose of hope, compassion and care. These three medications are difficult to measure, but extraordinarily powerful. The work of a lifetime in medicine (which keeps it such a fascinating endeavor) is to find out how powerful these gifts are, and to learn how to give them more and more effectively. (You cannot read about them in the PDR, and computerized medical algorithms will not include them.)

Your patients will open themselves up to you and trust you with their intimate secrets, hopes, dreams, and fears.

This trust happens irrespective of the setting, both in prison and in the most elite physicians' offices - it is one of the privileges of medicine that you are asked to share in the lives of individuals of all walks. The whole range of humanity can be found within your office, from the investment banker, to an impoverished immigrant, to a grandmother with 39 grandchildren (and she'll want to tell you about each one of them). Trust is the bridge to your patient so that you can give hope, compassion, and care.

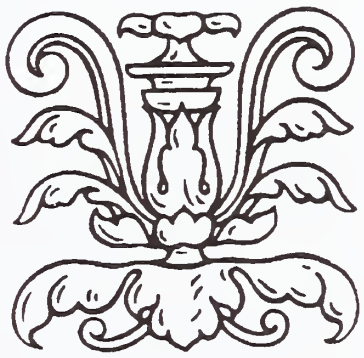
The foundation of hope is our expanding knowledge of disease, illness, and treatment. Anyone who questions the value of biomedical research needs only to read the story of the AIDS epidemic. The challenge is how to translate this knowledge into hope and care for our individual patients. It is not uncommon in prison for incarcerated patients to be initially hostile and suspicious. All the new medications and advances won't do any good if our patients refuse to take them! Trust must be built with time and patience. This may become all the more difficult in the setting of managed care, where time is limited. When you are first telling patients a diagnosis of HIV or trying to convince them that they will not die tomorrow, but that they may do well for years (hopefully until their child can graduate from high school or they'll be released from prison to reunite with their family), you cannot do it within a 12-minute time frame. We all need to fight the consumer-provider mentality in which the bond between physician and patient is weakened. As Dr. C. Everett Koop put it, "Consumer-Provider" brings to mind someone shopping for groceries or checking out the features of a new car. Medicine is so much more.

Frequently we cannot cure, but we can walk the path of illness with our patients and treat and ameliorate symptoms. This must be done always with care and compassion. As one of my patients noted, "we [physicians] can heal even though we cannot cure." When we cannot cure, even when we feel helpless, it is more important that we do not desert our patients. More than ever, they rely on you for knowledge, comfort, and care. That is when you're needed most!

The path of providing hope, compassion and care for patients will lead you to many challenges and maybe even risks. It may be the challenge of working in a prison, in a shelter, or an inner city clinic. It certainly will mean grappling with issues of managed care, the uninsured, and those patients who "fall between the cracks." Take those risks, meet those challenges head on. Don't ever hesitate to go right in to see the most difficult patient. Don't ever hesitate to make a home visit even though your colleagues will look at you askance because it's not part of "normal protocol," and make a visit to prison as a physician...you'll be surprised at how satisfying and enjoyable it is.

– Timothy Flanigan, MD
Medicine Department
The Miriam Hospital

[This commentary is adapted from a speech to the MD Class of 1996 during graduation ceremonies in May 1996.]



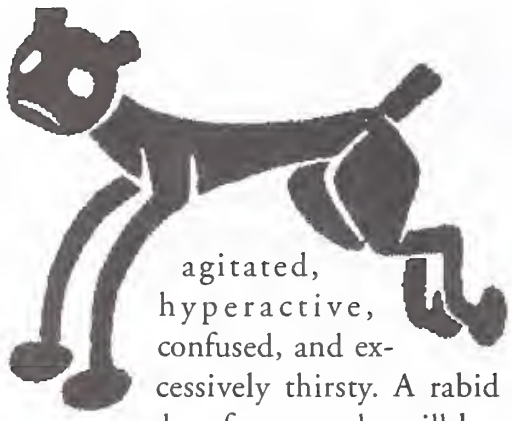
Mad Dogs and Englishmen

On the morning of July 4, 1885, Theodor Vone, grocer to the Alsatian town of Meissengott, opened his store at the customary hour of 6 AM. His dog, guardian of the store, unaccountably attacked him. The beast then knocked over 9 year-old Joseph Meister, who was about to enter. The dog was finally killed by its master, but not before young Joseph had been repeatedly bitten. The local physician examined the dog, noted the bloody foam over its mouth and made the diagnosis of rabies; he stated further that Joseph's survival was in doubt.

The following morning, July 5, Joseph, his mother and Mr. Vone hastened to Paris to entreat the aid of M. Pasteur who was said to have perfected a vaccine protective against rabies. Little Joseph thus became the first human to be successfully treated for an infection which, until then, was regarded as uniformly fatal.

Rabies, an acute infectious disease known since antiquity, is caused by a virus which ultimately attacks the nervous system but involves, in passing, the salivary glands. It is primarily a disease of lower mammals, both feral and domestic, and involves humans only under unusual circumstances.

Most pathogenic viruses, such as influenza, are airborne; or waterborne, such as poliomyelitis; while a very few such as AIDS and hepatitis are conveyed by body fluids. The mode of transmission of rabies, however, is unique. Infection in a susceptible mammal is established when bitten by a rabid animal. The virus ultimately attacks those brain segments which govern emotion, judgment and vegetative functions. Accordingly, the affected creature becomes acutely



agitated, hyperactive, confused, and excessively thirsty. A rabid dog, for example, will become intensely agitated and act irrationally; and in its rage it will randomly bite other animals or humans. Since its saliva now bears the virus, a skin-penetrating wound may effectively transmit the virus. The infected human, after an incubation interval of about six weeks, will then exhibit restlessness, insomnia, headache, fear of drinking water [hydrophobia] since swallowing provokes throat muscle spasms, followed by manic excitement culminating in enfeeblement, paralysis, exhaustion and death.

The name, rabies, is of Sanskrit origin. The Athenians called it *lyssa,* a word meaning madness. The books of Leviticus and Deuteronomy make passing mention of the sudden development of madness in beasts but assign no name to it. The postexilic Jews, on the other hand, were fully aware of rabies and decreed that any flesh "torn by beasts of the field" was no longer kosher, no longer fit for human consumption. In urban Rome rabies was a widely recognized public health threat. Pliny wrote that worms within the rabid hound's tongue provoked the madness. Virgil, on the other hand, said that rabies was caused solely by pestilential air. Shakespeare knew few poisons "more deadly than a mad dog's tooth."

It was a commonly held belief, found to this day, that if a dog's tail were bitten off on its fortieth day of life, it would be forever immune to rabies. And there were many saloons where a puppy's tail might be bitten off by an itinerant patron in exchange for a drink. Others placed greater faith in the protective influences of madstones, those concretions sometimes found in the stomachs of deer.

Eurasia, during the Middle Ages, experienced numerous outbreaks of rabies transmitted generally by packs of wild dogs, wolves, jackal or fox. St. Hubert, an 8th Century Flemish evangelist, guardian of certain chivalrous orders and protector of huntsmen, was assigned the onerous chore of patron sainthood for those afflicted with rabies. He is depicted with a heavy iron key suspended from his clerical robe. Historians believe that a heated intrument such as Hubert's key might have been used to cauterize dog bites. Earlier, Pliny had asserted that repeated dunking in a cold stream would cure rabies; and many a colonial New England town heeded this suggestion and used its ducking stool to combat both witchcraft and rabies. Immersion failed, either as an agency of redemption or anti-rabies therapy.

England enacted its first Dog Laws in 1868, requiring all strays be killed. Many American cities plagued with packs of wild dogs enacted similar legislation. On the streets of New Orleans, for example, poisoned sausages were distributed each night. By 1887, the British required that all dogs be licensed and, when in public, muzzled; and in 1897, the British further mandated that all imported dogs be held in lengthy quarantine to ensure that they were free of rabies. By 1902, England became entirely free of rabies. No cases of the disease were seen until 1918 when many returning soldiers smuggled in pet dogs some of which had been infected.

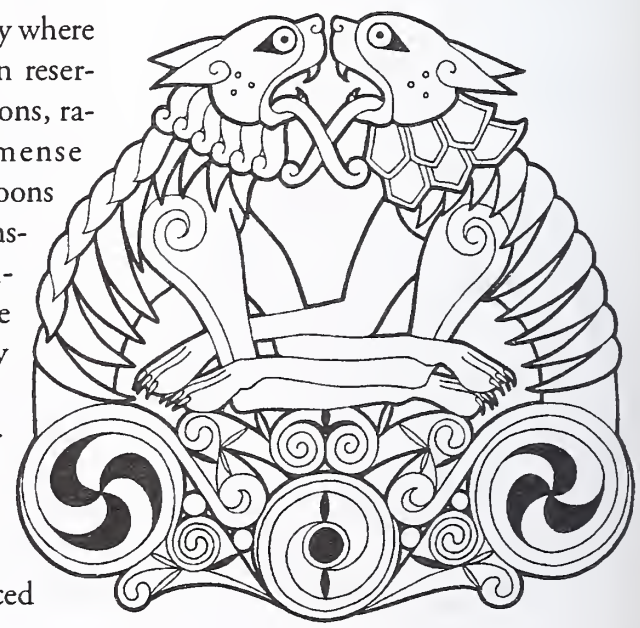
In their zeal to eradicate rabies, some jurisdictions such as Jamaica killed all of its dogs, feral or domesticated. This strategy worked only where dogs were the sole mammalian reservoir of rabies. But in most regions, rabies has infiltrated immense populations of wild skunk, raccoons and bats - all of which may transmit the disease to domestic animals, cattle or humans and are quite resistant to the customary anti-rabies control measures.

Mandatory anti-rabies vaccination of household pets, stringent quarantining of suspects, and careful surveillance of feral populations have reduced the incidence rate of human rabies in the United States. In the 1950's about 12 cases were recorded annually; this number diminished to about one case per year in the 1980's. But in the last decade the rate has increased slightly to about 2 to 3 human cases per year; in 1996, four verified cases have been documented in three of whom bats were incriminated; indeed, over half of the human cases of rabies in the United States, since 1980, has been associated with bats rather than dogs. In tropical nations rabies continues to exact a heavy toll in human lives, caused largely by rabid dogs.

The images of the erratically prowling, frenzied hound with foaming mouth and reddened eye; the rabid wolf pack invading a defenseless Siberian town; or the hordes of vampire bats descending by moonlight upon cattle and humans are mainly the stuff of groundless legends and contrived horror stories. Yet behind these collective nightmares of mindless jeopardy lies the inescapable reality that the rabies virus has now found an enduring home in a vast intercontinental reservoir of wild mammals; and through happenstance may occasionally affect humans.

Random acts of violence, excitation and acute dementia remain the hallmarks of this uniformly fatal disease. Was it perhaps rabies that prompted Euripides to exclaim: "Those whom God wishes to destroy, he first makes mad" ?

– Stanley M. Aronson, MD



The Brown University School of Medicine Class of 1997

Stephen R. Smith, MD, Hilary Sweigart, and Alexandra Morang

On May 26, 1997, 88 men and women received the Doctor of Medicine degree from Brown University - representing the 23rd class of physicians graduated from that institution in this century. If this class follows the pattern of preceding classes, approximately 14% will eventually practice in the State of Rhode Island. Of the 1,574 physician graduates of previous classes, approximately 220 (14%) are currently licensed to practice in Rhode Island.

This article will introduce the M.D. Class of 1997 to the physician community of Rhode Island, since many will be your future professional colleagues.

A Portrait of the Class of '97

Among the graduates, 45 were men (51%) and 43 were women (49%). The racial/ethnic composition of the class (Table 1) is similar to the previous year in the proportion of students from Asian-American backgrounds (25%). A little less than half of the students in the first four undergraduate years of the eight-year Program in Liberal Medical Education (PLME) are Asian American. Only 2% of the graduates are members of minority groups underrepresented in medicine (2 African Americans), as defined by the Association of American Medical Colleges (AAMC). Four other graduates are Hispanics but neither Mexican American nor mainland Puerto Rican, and two other graduates are black, but are citizens of Caribbean countries and thus not counted in the AAMC definition. This number is disappointingly low, but should rise in future years based on more successful recruiting of under-represented minority students in the PLME. For the past five years (1991–1996), about 18% of freshmen college PLME students have been from underrepresented minority groups. The percentage of underrepresented minority students in the first three years of the medical school is 15.8% (37 out of 234 students).

Abbreviations Used:

AAMC	Association of American Medical Colleges
EIP	Early Identification Program
PLME	Program in Liberal Medical Education

One fifth of the class (18 graduates) are residents of Rhode Island. They came from eleven different communities (five from Providence, three from Warwick, two from Cranston, and one each from Barrington, Bristol, East Greenwich, Kingstown, Lincoln, Manville, North Providence and Wakefield). The students' high schools reflect this diversity, with five students from Bishop Hendricken High School, two from South Kingstown High School, and the rest from eleven other high schools.

The M.D. Class of 1997 reflects the growing proportion of students from the PLME, with 39 such graduates (44%) having come through that route. The second largest cohort of students (21 graduates) came through the combined Brown–Dartmouth Medical Education Program in which students spend their first two years of medical school at Dartmouth, then transfer to Brown for the final two years.

The medical school entered into special agreements with several postbaccalaureate premedical programs (Brown University, Bryn Mawr College, and Columbia University) shortly after the PLME was inaugurated. Students from these programs decided upon a career in medicine only after completing college. Typically, they have engaged in other careers for several years following college. The goals in establishing this new route of admission were to maintain a rich diversity in the student body by admitting students who were older and who had different academic and life experiences as

Table 1
Demographic Characteristics of the M.D. Graduates of the Brown University School of Medicine Class of 1997

	No.	%
Sex		
Male	45	51%
Female	43	49%
Race		
White	56	64%
Asian American	22	25%
African American	2	2%
Hispanic	4	5%
Foreign National	4	5%
State of Residence		
Rhode Island	18	20%
New York	16	18%
California	16	18%
Massachusetts	5	6%
Pennsylvania	5	6%
Other Countries	4	5%
Washington	2	2%
Virginia	2	2%
New Jersey	2	2%
New Hampshire	2	2%
Connecticut	2	2%
Other States	14	16%

well as to round out the total class size to compensate for the expected attrition from the PLME.

Postbaccalaureate students represented 20% of the graduates. Of the 18 postbaccalaureate students, nine came from Bryn Mawr College, two from Brown, and seven from Columbia University.

Among the remainder of the class, five students were part of the Early Identification Program (EIP): three from Providence College, one from the University of Rhode Island, one from Tougaloo College. EIP students are offered provisional admission to the medical school during their undergraduate sophomore year. Of the remaining graduates, two were in the MD/PhD program, two were nonPLME Brown undergraduates, and one came through the Medical Education Program, the predecessor to the PLME.

Brown University was the most common undergraduate college with the Class of 1997: 47 graduates (53%). Providence College ranked second (4 graduates), and the University of California came third (3 graduates). Altogether, the Class of 1997 came from 34 different colleges and universities.

The most common undergraduate major among the class members was biology (including subdisciplines such as neural sciences and microbiology), with 39% of the class selecting that as their undergraduate field of study. Science majors taken together (including psychology) accounted for 65% of all academic concentrations, while 11% majored in the humanities and 22% in the social sciences. Among the humanities majors, history was the most common choice, while anthropology and health and society were the most popular choice among those majoring in the social sciences. The selection of major among the graduates is consistent with a trend toward a broader range of undergraduate ma-

Figure 1
Specialty Choices of the Brown University School of Medicine Class of 1997

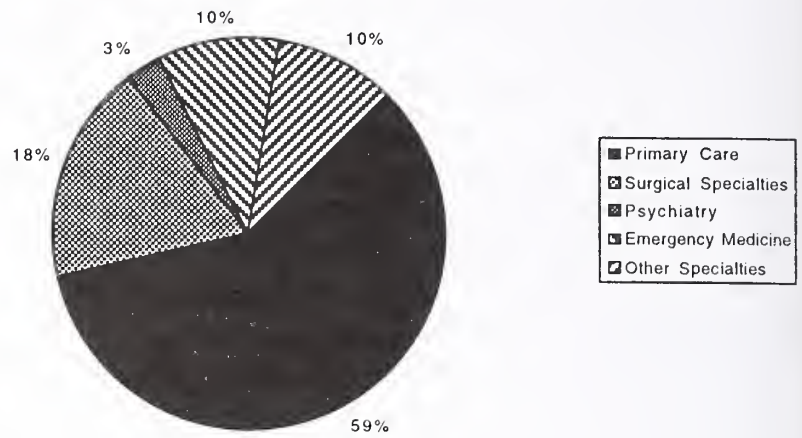


Table 2
Specialty Choices of the MD Graduates of the Brown University School of Medicine Classes of 1993–97

	1993		1994		1995		1996		1997	
Specialty Choice	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**	**No.**	**Percent**
Primary Care, Total	39	54%	44	59%	41	59%	53	65%	52	59%
Internal Medicine, total	20	28%	23	31%	18	26%	25	30%	16	18%
Categorical Medicine	16	22%	20	27%	15	21%	18	22%	11	13%
Primary Care Medicine	4	6%	3	4%	3	4%	7	9%	5	6%
Pediatrics	4	6%	10	13%	14	20%	10	12%	10	11%
Family Medicine	9	13%	6	8%	4	6%	13	16%	18	20%
Medicine/Pediatrics	0.0	0%	0.0	0%	0.0	0%	1	1%	3	3%
Obstetrics & Gynecology	6	8%	5	7%	5	7%	4	5%	5	6%
Surgery	2	3%	7	9%	7	10%	4	5%	6	7%
Surgical Subspecialties, total	10	14%	8	11%	9	13%	8	10%	10	11%
Ophthalmology	2	3%	2	3%	3	4%	2	2%	2	2%
Orthopedics	3	4%	4	5%	3	4%	4	5%	4	5%
Neurosurgery	1	1%	0.0	0%	0.0	0%	0.0	0%	1	1%
Urology	2	3%	1	1%	3	4%	0.0	0%	0.0	0%
Plastic Surgery	1	1%	0.0	0%	0.0	0%	1	1%	2	2%
Otorhinolaryngology	1	1%	1	1%	0.0	0%	1	1%	1	1%
Dermatology*		0%		0%		0%		0%	1	1%
Emergency Medicine	2	3%	1	1%	0.0	0%	3	4%	9	10%
Psychiatry	3	4%	7	9%	3	4%	2	2%	3	3%
Neurology	3	4%	1	1%	2	3%	4	5%	2	2%
Transitional and Preliminary	8	11%	3	4%	0.0	0%	6	7%	0.0	0%
Institutional Specialties, total	5	7%	4	5%	8	11%	2	2%	5	6%
Anesthesiology	2	3%	0.0	0%	3	4%	0.0	0%	1	1%
Pathology	1	1%	0.0	0%	0.0	0%	1	1%	0.0	0%
Rehabilitation Medicine	1	1%	1	1%	1	1%	1	1%	0.0	0%
Radiology and Radiation Onc	1	1%	3	4%	4	6%	0.0	0%	4	5%
Totals	72	100%	75	100%	70	100%	82	100%	88	100%

*Prior to 1997 1st year match in dermatology not possible

Table 3
State in Which the First Year of Residency Training is Located for the Brown University School of Medicine MD Class of 1997

State	No.	Percent
California	10	11%
Connecticut	1	1%
Colorado	1	1%
District of Columbia	4	5%
Florida	2	2%
Hawaii	1	1%
Illinois	2	2%
Maine	3	3%
Maryland	2	2%
Massachusetts	10	11%
Missouri	1	1%
New Mexico	1	1%
New York	13	15%
North Carolina	2	2%
Ohio	3	3%
Pennsylvania	10	11%
Rhode Island	20	23%
Texas	1	1%
Virginia	1	1%
TOTAL	**88**	**100%**

jors, reflecting the larger proportion of postbaccalaureate and PLME students in this class. Postbaccalaureate and PLME students were less likely to major in science than were traditional premedical students.

Where They Are Going

For the first time in the history of the medical school, family practice ranked first among the residency choices of graduates, with 18 selecting that specialty. The percentage of graduates choosing internal medicine dropped sharply, dipping below 20% (Table 2).

The proportion of the class entering specialties in primary care remains near 60% (Figure 1). This includes the fields of internal medicine, pediatrics, family practice, and obstetrics and gynecology. Emergency medicine posted a strong gain in popularity, accounting for more than 10% of residency choices - a first for the medical school.

The actual number of graduates who will eventually practice primary care after completing their graduate medical education training will be smaller than the 59% reported here, if the past is any indication. An analysis of longitudinal data collected by the AAMC of the graduates of the classes of 1987–1991 reveals that over half of the graduates who enter residency programs in internal medicine end up in a subspecialty of internal medicine, such as cardiology. About a quarter of those entering residency training in pediatrics will do likewise.

The data for Brown graduates is similar to the national AAMC longitudinal study data. Of those Brown graduates in the MD classes of 1987–1991, only 46% of those entering residencies in internal medicine actually went into general internal medicine practice. In pediatrics, the figure was 59%. Among the primary care residencies, only family practice did not exhibit this pattern. Actually, the number of graduates in those five classes who eventually entered family practice was greater than those who started out that way by about 14%. The AAMC data do not detail subspecialization in obstetrics and gynecology. The Brown data show that 96% stay in the field of obstetrics and gynecology, but the proportion who subspecialize is not known.

Applying these data to this class, about 39 graduates (44%) will actually practice in primary care. The changing climate in health care delivery is likely to increase that number, as graduates find fewer job opportunities in subspecialty medicine.

A similar trend is seen at the national level. For the third consecutive year, more than 50% of U.S. medical school seniors will pursue training in internal medicine, pediatrics, and family practice.[1] (The AAMC does not include obstetrics and gynecology among the primary care specialties.) The proportion of U.S. medical school seniors choosing first-year residency positions in one of those specialties increased from 54% to 56% in 1996. At the national level, internal medicine continues to lead the pack, with 21% of U.S. senior medical students selecting that specialty, and 17%, 12%, and 7% choosing family practice, pediatrics, and obstetrics/gynecology respectively.

Table 4 lists the Class of 1997 graduates and their residency destinations. Of the 88 graduates who will enter residency training next year, 20 graduates (23%) matched with Brown-affiliated residency programs in the state. New York City was the second most popular city for the 1997 graduates after Providence, with eleven choosing the Big Apple. Philadelphia took third place with seven, and Boston ran a close fourth with six members.

Table 3 lists those states where the graduates will be going for their first year of residency training. New York State will be home for thirteen graduates and ranks second to Rhode Island as the most popular state for residency training. The Class of 1997 has a warm spot for the cold Northeast, with 72% of the class deciding to stay in this region, up from 61% in the previous class. The West Coast remains at lower-than-usual choice of location, with only 15% of graduates locating there, similar to the 13% last year, and lower than the 25% typical for prior years.

Conclusion

The pattern of career choice of the M.D. Class of 1997 reflects the national trend toward careers in primary care and away from subspecialties. The decline in popularity of the West Coast may reflect an awareness of the job scarcity for physicians in that part of the country.

References

1. Association of American Medical Colleges (1997, March 19). U.S. Medical School Graduates' Rising Interest in Primary Care Indicates Trend. AAMC STAT [Online]. Available: <http://www.aamc.org/about/progemph/nrmp/release.htm>.

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Table 4
Brown University School of Medicine Class of 1997 Residency Positions

Name of Graduate	Hospital Name/Medical School Affiliation	Specialty
Aferzon, Mark	SUNY Health Science Ctr/Syracuse	Surgery-Prelim
	Syracuse/SUNY	ENT
Ahn, Sun Ho	Brown University Internal Medicine Residency	Internal Med-Prelim
	Rhode Island Hospital/Brown University	Radiology
Alford, John	Rhode Island Hospital/Brown University	Orthopaedic Surgery
Ali, Iman	Lenox Hill Hospital/New York University	Internal Med-Prelim
	Lenox Hill Hospital/New York University	Ophthalmology
Allard, Elizabeth	Queen Street Family Health Center/University Mass	Family Practice
Auger, Jane	Brown University Internal Medicine Residency	Internal Med-Prelim
	Rhode Island Hospital/Brown University	Radiology
Banik, Rudrani	Mt. Sinai Medical Center/University of Miami	Internal Med-Prelim
	University of California-Irvine/UC-Irvine	Ophthalmology
Baute, Lisa	Thomas Jefferson University/Jefferson Medical College	Ob/Gyn
Bell, Jennifer	Rhode Island Hospital/Brown University	Pediatrics
Benjamin, Damien	Graduate Hospital/University of Pennsylvania	Surgery-Prelim
Blackman, Carolyn	Rhode Island Hospital/Brown University	Internal Med-Primary
Blackman, Michael	Jackson Memorial Hospital/University of Miami	Med/Peds
Blanco, Emil	Presbyterian Hospital//Columbia	Internal Medicine
Busi, Kimberly	The New York Hospital/Cornell University	Pediatrics
Carr, Paula	Eastern Virginia Medical School	Family Practice
Caswell, Eloise	Mountain Area Health Education Center/Univ. of NC	Family Practice
Chi, Sureen	Washington Hospital Center/George Washington Univ.	Ob/Gyn
Chin-Hong, Peter	San Francisco General Hospital/University of California-SF	Internal Med-Primary
Chiu, Noel	Beth Israel-Deaconess/Harvard Medical School	Internal Med-Prelim
	Boston Medical Center/Boston University	Dermatology
Clyne, Brian	Univ. of Maryland Medical Center/Univ. of Maryland	Emergency Med
Cohen, David	The New York Hospital/Cornell University	Surgery-Prelim
	Hospital for Special Surgery/Cornell University	Orthopaedic Surgery
Coley, Andrew	Rhode Island Hospital/Brown University	Emergency Medicine
Dantuluri, Phani	Long Island Jewish/Albert Einstein	Orthopaedic Surgery
Daru, Jennifer	Children's Memorial Hospital/Northwestern University	Pediatrics
Davydov, Eric	Loma Linda Univ. Med. Ctr/Loma Linda Univ.	Internal Medicine
Delucia, David	Yale-New Haven Hospital/Yale University	Internal Med-Primary
Dickstein, Daniel	Rhode Island Hospital/Brown University	Peds/Psych/Child Psych
Divenuti, Gina	New England Medical Center/Tufts University	Internal Medicine
Fa, Christina	Univ. Calif-Davis Medical Center/Univ. Calif-Davis	Pediatrics
Farley, Julie	Providence Hospital/Georgetown University	Family Practice
Flanders, John	Roger Williams Hospital/Brown University	Internal Med-Prelim
	Brigham & Women's Hospital/Harvard Medical School	Anesthesiology
Frost, Jennifer	Univ. of New Mexico Medical Ctr/Univ. of New Mexico	Family Practice
Fujimoto, Andy	Kaiser-Permanente Medical-Fontana/UC-San Diego	Family Practice
Garren, Joshua	SUNY Health Care Center-Brooklyn/SUNY	Surgery-Prelim
Gilmartin, Geoffrey	Beth Israel-Deaconess/Harvard Medical School	Internal Medicine
Goodwin, Kim	Women & Infants Hospital/Brown University	Ob/Gyn
Han, Jini	Hospital of the University of PA/Univ. of Pennsylvania	Internal Medicine
Han, Joyce	Thomas Jefferson University/Jefferson Medical College	Family Practice

Table 4 (cont.)
Brown University School of Medicine Class of 1997 Residency Positions

Harbatkin, Carrie	NYU Medical Center/New York University	Ob/Gyn
Hawkins, Robert	Roger Williams Hospital/Brown University	Internal Med-Prelim
	University of Maryland Med Ctr/Univ. of Maryland	Radiology
Jurgens, Jennifer	Walter Reed Army Medical Center	Neurology
Kim, Gene	LAC-USC Medical Center/Univ. of So. California	Internal Medicine
Ku, Phyllidia	Maine Medical Center/University of Vermont	Internal Medicine
Lamendola, Chad	Lancaster General Hospital/Temple University	Family Practice
Latsis, Zoe	Carolinas Medical College/Univ. of North Carolina	Surgery-Prelim
Lawrence, Marilyn	Johns Hopkins Hospital/Johns Hopkins Med School	Internal Medicine
Lee, Calvin	University Hospital of Cleveland/Case Western Reserve Univ.	Surgery
Lin, James	Massachusetts General Hospital/Harvard Medical School	Pediatrics
Lin, Kathryn	Baylor College of Medicine-Houston/Baylor College of Med	Med/Peds
Mangi, Abeel	Massachusetts General Hospital/Harvard Medical School	Surgery
Mark, Yvonne	Memorial Hospital/Brown University	Family Practice
Mehta, Bina	University of Cincinnati Hospital/Univ. of Cincinnati	Pediatrics
Mitchell, Cristina	Memorial Hospital/Brown University	Family Practice
Moore, Meagan	Irvine Medical Center/Univ. of Calif.-Irvine	Ob/Gyn
Moreno, Raymond	University of Cincinnati Hospital/Univ. of Cincinnati	Emergency Med
Naidu, Srihari	The New York Hospital/Cornell University	Internal Medicine
Nevola, Chad	Baystate Medical Center/Tufts University	Pediatrics
O'Brien, Timothy	Univ. of Calif. San Francisco/UC-SF	Orthopaedic Surgery
Orange, Jordan	Children's Hospital/University of Pennsylvania	Pediatrics
Owyang, Charles	Children's Hospital of LA/Univ. of Southern California	Pediatrics
Papa, Giavanna	Butler Hospital/Brown University	Psychiatry
Phillips, Lindsay	Highland Hospital/University of Rochester	Family Practice
Reall, David	Lehigh Valley Hospital/Penn State-Hershey	Family Practice
Ruth, William	Maine Medical Center/Univ. of Vermont	Emergency Medicine
Simmons, Walter	Rhode Island Hospital/Brown University	Emergency Medicine
Sirulnick, Erik	Montefiore Medical Center/Albert Einstein	Internal Medicine
Skeete, Larry	Univ. of Hawaii Integrated Medicine Res/Univ. of Hawaii	Internal Med-Prelim
	Cook County Hospital/Rush Medical College	Emergency Medicine
Smith, Rebecca	The New York Hospital/Cornell University	Psychiatry
Sower, Elizabeth	Crozer-Keystone Health System/Med. College of PA	Family Practice
Stacia, Agnes	George Washington University	Internal Med-Prelim
	George Washington University	Emergency Medicine
Sudarsky, Jennifer	Beth Israel Medical Center/Albert Einstein	Family Practice
Sungarian, Arno	Rhode Island Hospital/Brown University	Surgery-Prelim
	Rhode Island Hospital/Brown University	Neurosurgery
Superczynski, Christopher	Memorial Hospital/Brown University	Internal Medicine-Primary
Swaroop, Asha	UC-Irvine Medical Center/University of California-Irvine	Family Practice
Taylor, Christopher	St. Mary Medical Center/UCLA School of Medicine	Internal Med-Prelim
	Harbor-UCLA/UCLA Medical Center	Neurology
Tenerowicz, Mark	University of Massachusetts	Emergency Medicine
Theodoro, Daniel	Barnes Jewish Hospital/Washington University, MO	Internal Med-Prelim
	Jacobi Medical Center/Albert Einstein	Emergency Medicine
Tobias, Adam	Hospital of the Univ. of PA/Univ. of Pennsylvania	Plastic Surgery
Van Achterberg, Margret	Rhode Island Hospital/Brown University	Pediatrics
Vance, Monique	Mt. Auburn Hospital/Harvard Medical School	Internal Medicine
Vaughan, Michael	Maine/Dartmouth Family Practice/Dartmouth Medical School	Family Practice
Viets, Danielle	Roger Williams Hospital/Brown University	Internal Med-Prelim
	Rhode Island Hospital/Brown University	Radiology
Vrees, Matthew	Rhode Island Hospital/Brown University	Surgery
Weissman, Diane	St. Mary's Family Practice/University of Colorado	Family Practice
Wilson, Scott	Memorial Hospital/Brown University	Internal Med-Primary
Wright, Erinn	Williamsport Hospital/Temple University	Family Practice
Wu, Emily	Baystate Medical Center/Tufts University	Med/Peds
Wu, Tammy	SIU School of Med & Affl Hospitals/Southern Illinois Univ.	Plastic Surgery

Out of the Ivory Tower; Medical Education Returns to the Community

Stephen R. Smith, MD

For the first half of this nation's existence, the predominant method of medical education was the apprenticeship model.[1] This model became associated with substandard training of physicians and was replaced by the university model advocated in Abraham Flexner's famous report for the Carnegie Foundation[2] and embodied in the Johns Hopkins University School of Medicine. As the second full century of the nation's history ebbs, the pendulum will swing back, leading medical education out of the ivory tower and back to the community, driven by the realization that real medicine can only be taught in the real world.

Medical education in this century rests upon 19th century faith in science and technology to solve most of humanity's problems. Discoveries in microbiology and pharmacology and the spectacular successes in surgery all lent credence to this positivist view. Scientific advancement continued unabated throughout the 20th century, though the direct translation of laboratory discoveries into miracles of medicine became less frequent, especially in the last half of the century.

The medical problems that remain vexatious at the dawn of the 21st century seem less likely to yield to the single scientific research discovery, like the perfection of the polio vaccine. In many ways, the physician's job has become more difficult. Patients present with ill-defined symptoms, insidiously progressive diseases, hidden risks, multiple and chronic problems, psychosocial overlays, myriad healing traditions and beliefs, all presented in the context of a rapidly changing social, economic, moral, and legal environment.

Educating physicians for the practice of medicine in the 21st century must recognize that the rough and rumpled world of reality is a far cry from the tightly controlled laboratory or the classical case presented in the textbook. Since the real world is where physicians will practice, this is where physicians should be trained. The rest of this article will offer more specific arguments why this change in venue will occur.

Abbreviations Used:

CT	Computerized tomography
ER	Emergency Room

The Myth of the Textbook Case

A 71-year-old woman complains of right temporal and retro-orbital pain, a runny nose, and a nonproductive cough, though she is otherwise in good health and is working full-time. The temporal artery is not tender and there is no fever. The patient is placed on amoxicillin for presumed sinusitis but does not improve. A second physician repeats the examination and switches the antibiotic to amoxicillin–clavulonic acid. The patient continues to complain of boring, constant retro-orbital pain, nasal congestion, and cough. An elevated erythrocyte sedimentation rate prompts a referral to a rheumatologist and institution of prednisone therapy. The patient gets no relief, is unable to sleep, and says she is feeling worse, though she is still able to work full-time. A CT scan of the head reveals no abnormalities. Two weeks after the initial presentation she is seen by the rheumatologist who notices that the patient is breathing rapidly. Chest x-ray reveals a large pleural effusion on the right side. Three weeks later the patient succumbs to rapidly progressive lung cancer despite radiation therapy.

This actual case history would present a problem for most physicians. This is not the way lung cancer usually presents. If anything, the case reads initially like a board question on temporal arteritis. This case history would never make it to a board examination because it deviates so much from the classical presentation. Yet this is the way that patients often present to the physician. Mistakes in diagnosis often occur in situations that are confused and confusing. How do we train physicians to be less prone to error in these types of situations?

Constantly providing medical students with classic presentations in lecture or even in small group problem-based learning formats may make them more likely to overlook facts that don't fit. In the real world of practice, students would often see patients with odd assortments of signs and symptoms that don't fit together neatly. Students would learn to be tentative in their conclusions, remain open to different possibilities, and be mindful of all the data, not ignoring those pieces that don't fit with a predetermined diagnosis. They would learn to become more comfortable with uncertainty.

Framing the Question

The call came in at 2 AM. "Dr. Smith, I don't think I need a tetanus booster. I had one only a few years ago. Do you think I need one?" The answer to why the caller thought she needed a tetanus booster was, "It's only a small cut. It's not even bleeding now."

One approach to this patient call would be to ascertain the adequacy of tetanus immunity relative to the nature of the injury. Another way to approach this inquiry would be to assume for the moment that tetanus prophylaxis was not the main issue and to probe for another meaning. As it turned out, the cuts were on the patient's wrists and the issue was actu-

ally one of an attempted suicide.

In the classroom, students are likely to be presented with the question of whether or not tetanus prophylaxis is indicated given a variety of different types of injuries and various lengths of time and completeness since the previous tetanus series. Such instruction would be part of a typical immunology or infectious disease course. In the behavioral medicine course, students would be asked how to respond to a patient who has slashed her wrists. Students might be very adept at answering these questions in that context, but their skill in answering those questions would not necessarily translate into effective performance in a practice situation. Tamblyn notes that the little research that exists on the relationship between performance on training examinations and performance in practice does not show a strong correlation.[3]

"My son drank my husband's Christmas present," reported the caller. "And what was it that he drank?" She replied, "A bottle of cologne." Later in the emergency department, I suggested that the nasogastric tube inserted for lavage be used to instill some whiskey as a specific antidote for the methanol in the cologne, since I didn't think this 7-year-old would be receptive to drinking the Calvert's that was on-hand in the ER. That was fine with the mother, though she added that she didn't think it would be a problem getting him to take it by mouth. Was this last aside worth a follow-up question? My Christmas morning had already been disturbed enough; why make it worse? I asked anyway, suspecting there was more to this case than a minor methanol ingestion. "Oh, we give him a 7-and-7 every night to help him sleep," she nonchalantly reported.

This is not the way parenting problems are typically presented. Clearly, this child's problem was more appropriately framed as one of inappropriate parental behavior and the youngest case of alcohol abuse I ever encountered, rather than one of toxicology. The case would have been mishandled had the child been simply detoxified and sent home.

Probably the most important thing a physician does in a clinical encounter is to frame the question. Any number of different formulations can be chosen. How does the expert clinician know how to ask the right questions? The most common answer is "clinical judgment." How do we teach students to acquire and use that "clinical judgment"? It isn't something that is readily conveyed in a textbook. Yet it is something that the master can teach the novice.

Medicine can't be learned from a book alone. The very notion of the practice of medicine conveys a sense of action, of performance, of application of theories and principles.

To learn from the master, the novice must work with the master. The master may even have difficulty expressing herself to the student in the abstract, but the teaching occurs around a real patient in subtle ways. The student demonstrates his approach, the preceptor watches and/or listens, makes suggestions, demonstrates herself, and lets the student try again. Each time this cycle is repeated, the student and the preceptor are able to communicate more clearly with one another, understanding the nuances and subtleties inherent in the interaction with the patient. Donald Schön compares this type of learning more to coaching than traditional teaching.[4] Learning about clinical judgment and other similarly vague aspects of the practice of medicine has often been referred to as the "art of medicine" (sometimes disparagingly), as if it can't be taught. These truly are the arts of medicine, but they can be just as surely taught and learned as can the virtuoso learn to play the violin or the artist learn to paint. Performance is the prerequisite to this kind of learning, and that performance is best conducted in the real world of practice.

Problem Solving

The 2-year-old was lethargic and anemic. The peripheral blood smear was microcytic with basophilic stippling. The blood lead level was 85 μg/dL. Chelation therapy was initiated and the rest of the hospital course was uneventful. A home visit revealed an old apartment with peeling paint, some of which had fallen into the crib of the patient's 8-month-old sibling. The baby's blood lead was also elevated, but not dangerously, and appropriate oral chelation therapy was initiated. A Spanish-language translator told the mother of the dangers of lead paint and how to minimize exposure. Calls to the landlord were unsuccessful in getting any action to deal with the problem. The local Legal Aid Society brought legal action against the landlord to force him to abate the lead paint problem and a social worker was able to have the family relocated into a safe apartment.

What do we mean by problem solving? Simple computer programs could solve the problem presented in the first two sentences of the case study. Given the child's weight and blood lead level, the computer would accurately define the preferred treatments of choice, the drug dose, and the protocol to follow. We don't need humans to make those calculations, subject as humans are to arithmetic errors and forgetfulness. But what do we test medical students on? Exactly the same thing. If a student can accurately (though much more slowly) replicate what the computer can do based on the same information, then the student is deemed to be proficient in the treatment of lead poisoning.

Without the human intervention that occurred after the first child had been started on appropriate therapy, this true story might have had a more tragic outcome. Problem solving in this case meant seeing the many dimensions of lead poisoning and then getting the job done. Getting the job done meant

visiting the apartment, getting a translator, telling the mother about the dangers to her other child, moving the crib and cleaning out the paint flakes, calling the landlord, not taking no for an answer, calling Legal Aid and being enough of an annoyance that someone paid attention to this case, consulting a social worker, calling the health department, and making sure that the medical treatments were being done correctly. That's problem solving. That can't be taught in a classroom. The only way to know if students can do that kind of problem solving is to have them do it.

Why couldn't we present medical students the story just as I have done here? Why couldn't we test them by presenting them with a similar case and asking them to write an essay (yes, an essay exam!) on what steps should be taken in a case of lead poisoning? This could be done, but it shouldn't be construed as problem solving. Problem solving involves those faculties of mind and character that allow students to figure out ways to overcome unanticipated obstacles and get the job done. Tracing the route of an expedition on a map isn't the same as making the expedition. In medical education, we ought to want our students to make the expedition.

Values

Like many other migrant workers seen in the clinic at Silver Creek the previous evening, Mr. Rodriguez's hematocrit result was in the anemic range when tested in the hospital's laboratory the next day. A stool sample would be needed, but Mr. Rodriguez didn't have a telephone in the ramshackle hut for which he and his family paid an exorbitant rent to the farm owner. So I drove out to the grape farm with a stool specimen container. As I got out of my car at the farm office, I was greeted by a foreman carrying a shotgun. My long hair (it was 1970) and "foreign" ways made him immediately suspicious. With my improvisation skills greatly enhanced by the presence of the shotgun, I explained that one of his workers had low blood probably from a parasite which would probably account for his laziness and low productivity. Unless I was able to identify the parasite with a stool sample and eradicate it, his whole workforce was at risk of being infected and similarly incapacitated. The foreman's attitude immediately changed and Mr. Rodriguez was soon brought to me at the end of the shotgun, which also facilitated getting the stool specimen.

While I try to bring some humor into this story in the years that I have been telling it, I didn't find it at all funny when it happened. My reaction was one of rage and indignation at the social injustice I beheld. In my weekly meetings with students who were part of the Appalachian Student Health Project, we read from the *Grapes of Wrath* and nonfictional accounts of the plight of migrant farm workers. We talked about our frustration in treating workers for low back strain, knowing full well that they would spend the next day manually pulling potatoes from the ground. We knew they could not afford to spend a day in bed because they would not be paid even their subminimum wage unless they were working. We knew they couldn't afford medications because on payday almost all of their wages went to repay the farm owner for their housing, food, and supplies all provided at exorbitant rates through the company store. We wondered how the cycle could ever be stopped when we saw their children, who followed their parents from camp to camp, bereft of an education and destined to follow in their parents' footsteps.

In the quarter-century since my experience in the Appalachian Student Health Project, the plight of the migrant farm worker has improved, though the last few years has seen the foreboding early signs of retrenchment. To a substantial degree, progress on this front can be attributed to the efforts of former medical students who organized and participated in the student health projects of the late 1960s and early 1970s. The students who were the leaders of the American Medical Student Association then became the physicians who rose to top administrative posts in the public health service and the top health legislative aides to influential members of Congress. The legislation that created the National Health Service Corps had its genesis in the House of Delegates of the American Medical Student Association in 1969 (then called the Student American Medical Association).

Nurturing a sense of social responsibility in medical students is best achieved by immersing them in the community where they can observe firsthand the reality of social injustice. To work well, these experiences must be carefully planned to include opportunities for reflection. These reflection sessions allow the students to process their feelings and reactions and to analyze the situation from a policy perspective. In today's educational jargon, this is called service learning. Service learning is a powerful pedagogical tool through which values can be instilled in medical students.

Values education is a controversial topic, especially in primary and secondary education. Yet, let us not forget that values are constantly being taught to medical students outside the formal curriculum in what is often referred to as the "hidden curriculum."[5] What are the values being conveyed when a resident tells a medical student to focus only on the chief complaint in order to shorten the hospital length of stay?

To counteract the business-oriented value system of managed care, medical educators need to look outside the traditional inpatient setting as the proper venue for teaching a different set of values. For example, while the realities of managed care might narrow the focus of hospital care, students could be required to contact patients a week after discharge, at a minimum by telephone, and preferably by a home visit. The values of continuity and comprehensive care, advocacy, and consideration of broader social, cultural, and environmental contexts of health care can be emphasized in this manner.

Conclusion

Medicine can't be learned from a book alone. The very notion of the *practice* of medicine conveys a sense

of action, of performance, of application of theories and principles. The *art and science* of medicine connote the dual nature of medicine as both an art and a science. Like the artist, the physician must work with and in the medium of the art. Finally, the *profession* of medicine consists of a rich tradition of values brought to life through wise judgment and action. That wisdom comes from experience and the guidance of one's teachers. Only the cauldron of real experience will test the professional's courage and commitment to act on those values.

Perhaps the silver lining of the cloud of managed care will be the changes it forces medical education to make, leaving the ivory tower and returning to its roots in the community.

References

1. Smith SR. Preceptorships and Medical Education. *Conn Med* 1977;41(6): 362–365.
2. Flexner A. *Medical Education in the United States and Canada: A Report to the Carnegie Foundation for the Advancement of Teaching.* 1910. Reprint, Washington, DC: Science & Health Publications, 1960.
3. Tamblyn R. Is the Public Being Protected? Prevention of Suboptimal Medical Practice Through Training Programs and Credentialing Examinations. *Evaluation & the Health Professional* 1994;17(2): 198–221.
4. Schön DA. *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions.* Jossey-Bass Publishers, San Francisco, 1987.
5. Hafferty, FW and Franks R. The Hidden Curriculum, Ethics Teaching, and the Structure of Medical Education. *Acad Med* 1994;69(11): 861–871.

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Where Are They Now?

Judi D. Braman

Less than twenty-five years ago Brown University graduated its first class of 58 medical students. On May 23, 1997, Brown University School of Medicine celebrated its 22nd commencement and 88 students received their medical degrees - bringing the total alumni/ae body to 1,662. Much change has taken place in the Medical School over 23 years. The maturation process of the Medical School resembles the stages in human development, from infancy, to young childhood, to adolescence, and young adulthood. I use this analogy when talking with graduates, as well as medical students, faculty and members of the community at large. I believe it places the age of the school, as well as the graduates in the proper context, to better understand just how far we have come in our short history.

Table 1
Brown University School of Medicine
Ethnic Groups
M.D. Classes 1975 - 1997

Asian/Pacific Islander	213
Black	9
Black Foreign	4
Black Non-Hispanic	78
Caucasian	1297
Central/South American	1
Chicano/Mexican American	11
Cuban	3
Hispanic	20
Portuguese American	13
Puerto Rican	13

Our Alumni/ae

Where are they now? What are they doing? Where are they heading in this time of enormous change in health care?

Much information was gleaned from our alumni information system. Less scientific but as valuable is the information collected during my travels across the country, as I meet with alumni/ae at scientific meetings, receptions, educational programs, and dinners hosted by the Medical Alumni Office, and with faculty colleagues and administrators in the School of Medicine. The most interesting information comes via the Internet. (We have provided graduates with an alumni office e-mail address, and a Brown Medical Alumni Homepage, soon to become interactive). So while some of this research is anecdotal, I think the picture it paints is a fairly ac-

Table 2
Brown University School of Medicine
Clinical Specialties*
M.D. Classes 1975 - 1997

Dermatology	8
Diagnostic Imaging	42
Family Medicine	163
Medicine	671
Neurology	28
Neurosurgery	7
Obstetrics/Gynecology	101
Ophthalmology	48
Orthopaedics	31
Pathology & Laboratory Medicine	28
Pediatrics	191
Psychiatry & Human Behavior	71
Public Health	3
Radiation Medicine	5
Research	3
Surgery	228

*Not broken down by sub-specialty

Note: 34 unknown

Table 3
Brown University School of Medicine
M.D. Classes 1975 - 1996
Faculty Appointments
Table 3

Total # with faculty appointments *	167
Professor	3
Associate Professor	36
Senior Associate Professor	1
Assistant Professor	86
Assistant Adjunct Professor	1
Acting Assistant Professor	1
Instructor	24
Lecturer	1
Clinical Professor	1
Clinical Associate Professor	3
Clinical Assistant Professor	10

*figures as of 7/8/96 from the Association of American Medical Colleges (AAMC) Annual Faculty Roster System Alumni Report

curate representation. Over the last thirteen years this represents my personal interactions with more than 1,200 of the 1,662 graduates.

Our graduates are thriving and for the most part still think they made the right decision by going into medicine. However, like physicians in general, many Brown medical alumni express a growing concern that their role as the patient's advocate is being compromised by the ever changing world of medicine as it moves into the next millennium. In addition, they are placing somewhat more emphasis on striving for balance in their lives, seeking career paths that allow them to grow not only as clinicians, but as scholars, educators, and scientists. And a growing number of these physicians, recognizing the need to understand the financial and management principles of health care systems, are pursuing advanced degrees in law, business, and health care administration.

Yet at that same time there is more emphasis on balancing the practice of medicine with other interests, interests as diverse as performing national and international volunteer work, advocating for better medicine both here and in developing countries, or attaining a goal as personal as climbing Mt. Everest or being an accomplished artist. All of this and still there is more; there is the desire to have a family life, or just to have a life in general. The dilemma - when and how to best blend personal goals with a professional life that is demanding and rewarding, both physically and mentally. I found that more often than not, graduates' views on medicine in general and the balance between the professional and the personal drive decisions on where and how to practice medicine (e.g., managed care vs. private practice, shared residencies, etc.). Lifestyle and quality of life play a significant role in this decision making process. In part this may be a sign of the time, but I believe it is also due at least in part to the young age of both our school and our graduates (the average age is 36 years).

There are 1,037 male and 625 female graduates as of May 26, 1997. The largest population of alumni/ae are Caucasian; the second largest population, Asian/Pacific Islander (Table 1). Of the 1,662 graduates, 671 are practicing internal medicine or a subspecialty of medicine. There are 228 in surgery, 191 in pediatrics, 163 in family medicine, 101 in obstetrics/gynecology, and 71 practicing psychiatry. For the full breakdown by specialty see Table 2. The number of graduates currently practicing in Rhode Island is 184 or 11 % of the total alumni body. Nationally, 167 alumni hold faculty appointments, 3 are full professors, 36 are associate professors, and 86 are assistant professor. (Table 3). Of the 167 with faculty appointments, 68 hold appointments at Brown University (34% of the 184 graduates practicing in the state). Universities with Brown alumni on the faculty include but are not limited to: Baylor College of Medicine, Brown University School of Medicine, Case Western Reserve, Columbia, Cornell, Dartmouth Medical School, Duke University School of Medicine, Einstein College of Medicine, Emory University School of Medicine, George Washington University School of Medicine, Harvard, Johns Hopkins, Mayo, Northwestern, Stanford, SUNY,

Table 4
Brown University School of Medicine
Geographic Breakdown by Alumni Regions*
M.D. Classes 1975 - 1997

Northeast	965
South	232
Southwest	46
Midwest	151
West Coast	221
Rocky Mountain	18
Alaska	1
Hawaii	8
Foreign:	
Canada	4
China	1
England	1
Greece	2
Japan	2
Korea	1
Republic of Singapore	2
Thailand	1
Armed Forces in Europe and the Pacific	6

*figures from Brown University Alumni/Development Computing Services

Tufts, UCLA, UCSF, University of Pennsylvania, University of Arizona College of Medicine, University of Washington, and Yale University School of Medicine - 65 schools in all.

The geographic distribution of alumni not surprisingly mirrors the population as a whole. (Table 4) The largest population is in the Northeast, (58% of all graduates).

Most interesting is the diversity, depth and breadth of graduates' interests, as they weave the philosophy of their medical education experience at Brown into their daily lives. I wanted to bring you into the lives of some of our graduates without offending the more than 1,600 alumni, all of whom have stories worth telling. Yet I would be remiss if I didn't at least try to give you a small sampling of where they are and how they are doing. I decided that perhaps the best way to approach this would be to concentrate on the leadership in the Brown Medical Alumni Association, the governing body of the more than 1,600 graduates, as well as alumni recently appointed to the Medical School's Board of Overseers formed in 1996. This would represent a fairly accurate cross section of the larger group. In addition, I have highlighted two graduates who recently returned to our state in part in recognition of significant accomplishments to the communities they serve and the skills and qualities that gained them national recognition by their peers.

Judith Owens (Stively) '77, MD'80, the immediate past-president of the Brown Medical Alumni Association, is an assistant professor of pediatrics at Brown University and the Director of the Continuity Clinic for pediatric residents at Hasbro Children's Hospital. She serves on numerous community and professional committees, including the State's Primary Care Task Force, and the Institutional Self Study Task Force at Brown University. Her current research is dedicated to children with Attention Deficit Disorder (ADD) and Sleep Disorders in children and adolescents.

Anthony Caldamone '72, MD'75, the current President of the BMAA, is a professor of surgery at Brown and Director of the Residency Program in Urology at Rhode Island Hospital. His work with Physicians for Peace has taken him to the West Bank, the Gaza Strip and Bethlehem. In addition he is active in "Healing Wings," providing ministry to critically ill children from Latin America.

Pardon Kenney '72, MD'75, President-elect of the BMAA, and a member of the newly formed Board of Overseers for the School of Medicine, is a clinical professor of surgery at Tufts University School of Medicine and Chief of Surgery at Faulkner Hospital in Boston. He will chair the 25th anniversary celebration (in the year 2000) for the Medical School.

Jonathan Elion '72, MD'75 chairs the Alumni Annual Fund for the School of Medicine and serves as Chair of Development for the BMAA. He is an associate professor of medicine at Brown University. In addition to being an accomplished academician, cardiologist and computer scientist, Dr. Elion is an accomplished musician.

Joel Shalowitz' 74, MD'77, a regional director for the BMAA, is a professor of medicine at Northwestern University and professor and director of the Health Services Management Program at the Kellogg Graduate School of Management in Evanston, Illinois.

Bruce Becker '78, MD'81, Secretary-Treasurer of the BMAA, is an assistant professor of community health at Brown University School of Medicine and an attending physician in emergency medicine at Rhode Island Hospital. Dr. Becker works with AmeriCares, a non-profit humanitarian organization which responds immediately to emergency medical needs and supports long term health care programs around the world. He has served as medical director for two AmeriCare's Emergency Medical Training Projects, in Kyrgystan, part of the former Soviet Union and in the Yamal Peninsula of Russia, and often travels with Brown graduates who seek front line experience as part of their residency programs:

Paul von Oeyen '71, MD'75 is assistant professor of Ob-Gyn, Assistant Director of Maternal Fetal Medicine and Medical Director of Labor & Delivery at Wayne State University. He has served in a volunteer capacity for several years at Brown as a member of the BMAA Board of Directors, on the Corporation Committee on Medical Education and currently serves on the Corporation Committee on Biomedical Affairs.

Mark Blumenkranz '72, MD'75 is a clinical professor of ophthalmology, Director of Clinical Programs, and Service Chief of Ophthalmology at Stanford University. He has published more than 100 peer reviewed articles and book chapters in the field of vitreoretinal diseases.

Nora Burgess '74,MD'77 is Chief of Cardiovascular Surgery at the Permanente Medical Center Group in San Francisco. She is a Brown University Trustee, serves on the Board of Overseers for the Medical School and Chairs the Corporation Committee on Biomedical Affairs at Brown.

Melvin Burton, MD'83 is an instructor at Harvard Medical School/ Massachusetts General Hospital and serves on the Board of Overseers at Brown.

Deborah DeHertogh '74, MD'77 is the Director of Clinical Research at Bristol Myers Squibb in Wallingford, CT. She is currently on the Board of Overseers for Brown and served several years as a volunteer on the Board

of the BMAA.

Gregory Miller '77, MD'81 lives in Salt Lake City, Utah. He is the Medical Director of Stewart Rehabilitation Center in Ogden, Utah and specializes in neuro-rehabilitation and chronic pain management. He also serves on the Board of Overseers for the Medical School.

In addition to graduates who currently serve in leadership roles at Brown there are two final alumni I would like to mention. The first is Seth Franklin Berkley '78, MD'81 who recently returned to Brown to give the 2nd Annual Sauber Distinguished Medical Alumni Lecture as a Commencement forum. His lecture was titled, "1997 and No HIV Vaccine: A Failure of Science or Public Policy." The individual selected for this honor embodies the philosophy of Brown's medical education program, i.e., an individual who views medicine as a socially responsible human service profession. Dr. Berkley is currently the Associate Director of the Health Sciences Division at The Rockefeller Foundation and an adjunct associate professor of medicine at Brown. He joined the Foundation in 1989 as a program scientist managing the Division's population-based health care programs, working with Third World countries to build their capabilities in epidemiology and he has written widely on the AIDS epidemic and other public health concerns. Dr. Berkley worked for the U.S. Public Health Service specializing in medical epidemiology and disease prevention as well as developing innovative public health programs including; Public Health Schools without walls in Zimbabwe, Ghana and Uganda; an international program to support non-governmental organizations working on AIDS; and managing the International Clinical Epidemiology Network of over 400 physicians working on reform of medical education and improved clinical care in 31 medical schools in 18 countries.

Lastly, Richard J. Migliori '78, MD'81 recently returned to Rhode Island to assume the position as President and Chief Executive Officer of United HealthCare of New England serving 232,000 individuals in Rhode Island and Massachusetts. He trained in Minneapolis as a transplant surgeon, and there joined a multispecialty group of 300 physicians. Eventually that group merged with the hospital and became known as Health System-Minnesota. He was the CEO of that Health System before coming to Rhode Island to assume his current position.

In summary, I hope that this article leaves the readership with a more complete picture of our alumni, where they are, and what they are doing. Brown medical alumni appear to be living their medical education experience, as well as the Medical School's mission to produce graduates who are; 1) broadly and liberally educated, and 2) view medicine as a socially responsible human service profession. This commitment has been a part of the tradition of Brown's curriculum from the beginning. I think Brown graduates demonstrate that they believe medicine is much more than a mastery of skills and knowledge, and that the well-being of the community depends on more than the discovery of new therapies and techniques. It requires a commitment to medicine as a human service profession. And as we move towards the next millennium, I believe it is important that we continue to ask the question, Where Are They Now?

Finally, I realize that some of the information in the article is based on personal observations and impressions and I am curious to know whether or not graduates share my views and assessments. Therefore, over the coming months we will be working to provide a more complete profile of our graduates, and we will be asking the alumni/ae to tell us in their own words what they think about their medical education experience at Brown, about their career choices, and about medicine in general. The future of medicine will depend in no small part on having physicians who continue to believe that being a physician is a human service profession.

Acknowledgement

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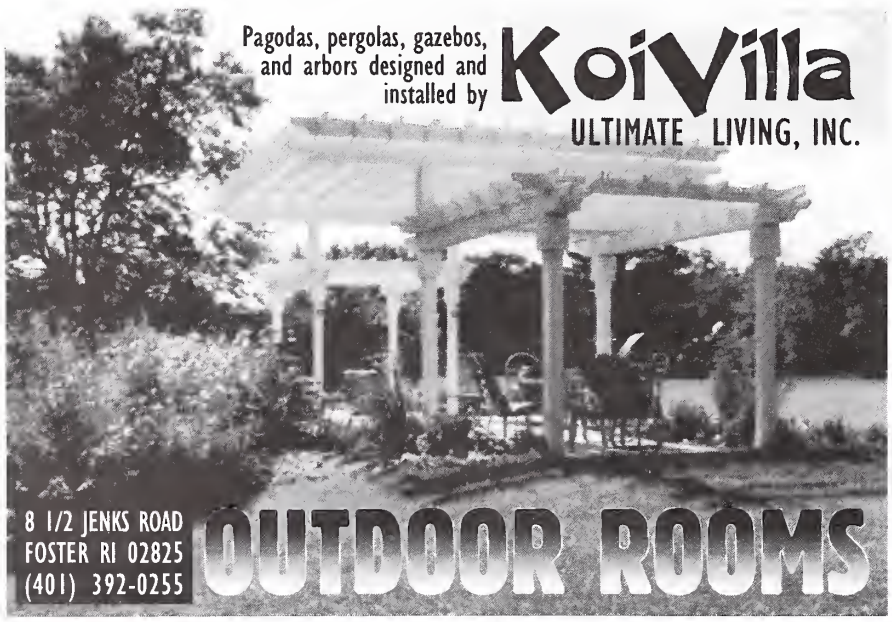

Physicians Newly Licensed in Rhode Island During 1996

Nikki Deary, Milton W. Hamolsky, MD, and Stanley M. Aronson, MD, MPH

At yearly intervals, the Rhode Island Board of Medical Licensure & Discipline, a division of the Department of Health, offers a brief demographic profile of those allopathic physicians who had been newly licensed in this state during the preceding year. The current description of newly licensed Rhode Island physicians represents the seventh such report emanating from the Board.[1-6]

During the calendar year 1996, 294 new physicians were granted licenses by the Board, a substantial increase over the number of new medical licenses issued in prior years [Table 1]. It represents the most licenses ever issued by the Board during a single year. In terms of the total number of licensed physicians in Rhode Island, however, the 294 new practitioners is only slightly more than the 277 physicians who retired, whose license expired, or who died during the same interval. The net addition to the roster of state physicians, in 1996, was only 17.

Gender and Age:

Table 1 summarizes the age and gender distribution of the physicians newly licensed in 1996 and compares these data with comparable information describing the cadre of physicians licensed during the preceding four years.

During this hemidecade, the number of women physicians entering the state has increased from 69 in 1992 to 104 in 1996. The percent of women physicians amongst those newly licensed, however, has remained stable at about 35%. The average age of the newly licensed physicians has also remained about the same, with the women typically 2 - 3 years younger, on average, than their male colleagues. If the older physicians entering the state [ie, 60 years or older] were to be eliminated from consideration, the gender-related age differences vanish since 10 of the 11 new licensees over 60 were male. As in previous years, the older physicians entering the state had been recruited principally for administrative and academic posts.

Some of Rhode Island's newly licensed physicians state that their offices in Massachusetts or Connecticut will remain as their primary places of practice. They had sought Rhode Island licensure so that they may occasionally see local patients in consultation or in some instances establish a satellite office. The number of licensed physicians in Rhode Island is not, therefore, an accurate determinant of Rhode Islanders' access to physicians. Furthermore, many of the newly licensed are still in residency or fellowship training and have requested licensure now so that they might engage in some limited substitute practice when they are not formally on hospital duty.

Places of Birth:

Table 2 summarizes the places of birth of the 1996 contingent of Rhode Island physicians and compares these with data from the 1993 - 1995 groups. About 55% of the new group were

Table 1
Physicians Newly Licensed in Rhode Island: Age and Gender

	1992	1993	1994	1995	1996
No. males	130	190	151	180	190
No. females	69	69	83	84	104
Total	199	259	234	264	294
Percent females	*34.7%*	*26.6%*	*35.5%*	*35.5%*	*35.4%*
Aver. age, males	36.5	37.3	37.6	37.6	37.1
Aver. age, females	34.2	36.3	35.1	34.5	34.7
Percent 61 or older					
males	*4.6%*	*1.6%*	*4.0%*	*3.3%*	*4.7%*
females	*0%*	*0%*	*1.2%*	*0%*	*0%*
Total no. licensed physicians*	2,835	2,898	3,267	3,286	3,303**

*: No. physicians [M.D.] with active Rhode Island licenses as per January 2 of the year signified.
**: Represents a 0.5% increase over the prior year.

Table 2
Physicians Newly Licensed in Rhode Island: Places of Birth

Place of Birth	1993	1994	1995	1996
Connecticut	8	8	12	12
Massachusetts	27	23	31	37
Maine	2	0	0	1
New Hampshire	1	1	1	0
Rhode Island	23	17	17	18
Vermont	1	1	0	1
New England, total	62 [23.9%]	50 21.4%]	61 [23.1%]	69 [23.5%]
District of Columbia	5	4	2	3
Maryland/Delaware	2	4	4	2
New Jersey	14	14	11	17
New York	56	45	54	52
Pennsylvania	12	13	10	18
Middle Atlantic, total	89 [34.4%]	80 34.2%]	80 30.3%]	92 [31.3%]
Southern states	16	15	13	10
North Central states	9	22	12	14
Midwestern states	13	11	22	21
Mountain states	5	1	3	4
Pacific states	5	10	7	7
Remaining states, total	48 [18.5%]	59 [25.2%]	57 [21.6%]	56 [19.0%]
Canada	4 [1.5%]	2 0.9%]	6 [2.3%]	6 [2.0%]
Countries, other	56 [21.6%]	43 18.4%]	60 [22.7%]	71 [24.1%]
Total	259	234	264	294

born in New England or the middle Atlantic states, a figure which has not varied appreciably during the past four years. Also, as in prior years, physicians born in Massachusetts and New York comprise about 30% of this group.

It is estimated that about 50 Rhode Island-born individuals annually receive the MD degree from US or overseas schools of medicine. However, only 6.1% 0f the 294 newly licensed physicians in 1996 were native Rhode Islanders. Since fewer than 20 per year, on average, have elected to establish their practices in Rhode Island during the past decade [Table 2], it must be presumed that the majority of native Rhode Islanders find the professional pastures in other states more appealing or challenging.

Geographic Sites of Medical Education:

Summary information regarding the state and national locations of the medical schools attended by Rhode Island's newly licensed physicians may be found in Table 3. The frequency data show little change from the previous few years and no trends are as yet apparent.

US/Canadian schools continue to provide about 80% of all newly licensed physicians, with 55.1% graduating from New England and middle Atlantic medical schools. Graduates of European medical schools made up 5.1% of the 1996 cadre of physicians with but one physician from an Italian medical school [University of Rome]. This is in striking contrast to the large numbers of Italian graduates who had established their practices locally in past years.

The off-shore Caribbean medical schools continue to provide between 2 and 3% of Rhode Island's newly licensed physicians.

The number of Asian medical school graduates has risen in 1996, with 11 physicians educated in Indian schools, 4 in Pakistani schools and 5 in Philippine schools.

A moderate concordancy exists between place of birth and place of medical education. Amongst the 157

Table 3
Physicians Newly Licensed in Rhode Island: Location of Attended Medical Schools

	Year of Rhode Island Licensure					
Region	before 1992	1992	1993	1994	1995	1996
New England	25.6*	29.4	25.9	24.4	25.1	25.5
Mid Atlantic	29.3	26.9	31.7	33.3	29.5	29.6
USA, other	17.1	26.9	19.3	27.3	26.9	22.4
Canada	2.0	1.5	3.9	0.9	3.4	3.1
USA+Canada total	*74.0*	*84.7*	*80.8*	*85.9*	*84.9*	*80.6*
Latin America**	5.4	4.5	5.0	1.7	4.2	4.4
Asia	5.8	5.0	3.9	3.0	6.1	6.8
Middle East***	3.5	2.5	3.5	3.4	1.7	3.1
Africa	0.3	0.4	0.7	0.4	<0.1	0
Europe, west	8.9	1.5	4.2	4.7	2.2	3.1
Europe, east	2.0	1.5	1.9	0.9	<0.1	2.0
Other, total	*25.9*	*15.4*	*19.2*	*14.1*	*14.2*	*19.4*
No. licensed	2,707	201	259	234	264	294

*: percent
**: includes Caribbean island medical schools
***: Includes Egyptian medical schools

Table 4
Physicians Newly Licensed in Rhode Island: Most Commonly Attended Medical Schools*

Licensed Prior 1993	1993	Licensed In 1994	1995	1996
Tufts	Brown	Brown	Brown	Brown
Brown	Tufts	State Univ NY**	Tufts	New Jersey***
Boston	State Univ NY	Tufts	State Univ NY	State Univ NY
State Univ NY	Boston	Boston	U Mass	Boston
Bologna	Columbia	Columbia	Boston	Tufts
Georgetown	Pennsylvania	Dartmouth	NY Med	Vermont
Harvard	New Jersey	New Jersey	New Jersey	Georgetown
NY Med	Dartmouth	Cornell	McGill	U Mass
Vermont	Harvard	Vermont	Yale	Jefferson
Jefferson	U Mass	U Mass	Columbia	Einstein
Columbia	Jefferson	Geo Washington	Einstein	U Conn
Yale	NY Med	NY Med	Georgetown	Pennsylvania

*: listed in rank order
**: represents medical graduates of four geographically separated campuses [Brooklyn, Syracuse, Stony Brook, Buffalo.]
***: Represents medical graduates of two geographically separated campuses [Newark and Rutgers.]

male physicians receiving their MD degrees from US/Canadian schools, 141 [89.8%] were native-born; amongst the 80 women physicians with MD degrees from US/Canadian medical schools, 73 [91.2%] were native-born. Amongst the 33 male physicians who received their MD degrees from international schools, 30 [90.1%] were foreign-born; and amongst the 24 women physicians who obtained their MD degrees from international schools, 24 [83.3%] were foreign-born.

Those medical schools which have contributed the greatest numbers to the pool of Rhode Island physicians are listed, by year, in table 4. Brown University continues to provide the greatest number of practitioners to this state as it has for the past three years. Graduates of the state university medical schools of New Jersey and New York continue to migrate to Rhode Island in significant numbers.

The 1996 ranking list (Table 4) highlights a number of features: first, that all of the high-ranking medical schools are confined to the New England-middle Atlantic region. Second, that graduates of the publicly funded, regional medical schools constitute an increasingly important physician source for this state. In the last half-century, it should be stressed, three new medical schools were established in New England: Connecticut and Mas-

Table 5
Physicians Newly Licensed in Rhode Island: Distribution in Percent by Gender, Specialty and Year of Licensure

Specialty	Males 1993	Males 1994	Males 1995	Males 1996	Females 1993	Females 1994	Females 1995	Females 1996
Primary care*	29.5	40.4	28.3	39.4	58.0	63.9	47.6	43.3
Non-surgical specialties**	26.8	21.9	36.7	21.1	14.5	14.5	30.0	32.7
Surgical specialties***	21.6	13.2	15.6	20.0	10.1	4.8	6.0	11.5
Emergency medicine	5.3	5.3	4.4	4.2	4.4	3.6	0	0
Institution-based specialties+	16.8	19.2	15.0	16.3	13.0	13.3	16.5	12.5

*: includes family medicine, general practice, pediatrics, obstetrics/gynecology, and internal medicine without a defined subspecialty.
**: includes internal medicine subspecialties, psychiatry, neurology and dermatology.
***: includes general surgery, orthopedics, ophthalmology, otolaryngology, urology, neurosurgery and plastic surgery,
+: includes pathology, radiology, physical medicine, anesthesiology and administrative medicine.

Table 6
Physicians Newly Licensed in Rhode Island: Geographic Location of Residencies/Fellowships

Location	US/Canadian* Male	US/Canadian* Female	International** Male	International** Female	All
Rhode Island	60	25	16	9	110
New England,other	51	20	2	5	78
US/Canada, other	46	35	14	10	105
Other	0	0	1***	0	1
Total	157	80	33	24	294

*: Graduates of United States or Canadian schools of medicine
**: Graduates of internationally located medical schools
***: Training completed in Australia

sachusetts, both wholely state financed, and Brown, largely privately funded. During this same interval six new medical campuses were established in New York and New Jersey, all state financed and managed; and four of these had replaced private schools which ceased to operate. And third, that decreasing numbers of medical graduates of the Ivy schools [with the exception of Pennsylvania and Brown] are selecting Rhode Island as a place to establish their practices.

While certain medical schools send substantial numbers of their graduates to this state, this should not obscure the fact that there is an astonishing diversity of schools represented by these 294 new licensees. There are 68 different medical alma maters amongst the 157 males who had attended the US/Canadian medical schools; and 48 different medical campuses amongst the 80 women who had attended the US/Canadian medical schools. Indeed, amongst this group of newly licensed physicians, every New England, New York, New Jersey and District of Columbia medical school is represented.

Amongst the Canadian medical schools, McGill continues to provide the greatest number of graduates to Rhode Island.

Licensure Pathway and Numbers of Active Licenses:

Over 75% of the new licensees were certified by the National Board of Medical Examiners through one examination mechanism or another. The remaining licensees presented certification attesting that they had successfully passed a state-managed FLEX examination. There were no requests for direct, limited licensure, in 1996, from the Dean of Medicine at Brown.

Applicants for medical licensure in Rhode Island are required to inform the Board if they hold current licenses in other jurisdictions. Of the 294 newly licensed, 30.3% held no other licenses at the time of application; 31.6% held a single medical license in one other state; 21.1% held medical licenses in two states; and 17.0% held medical licenses in three or more states. Indeed, 3.7% of this group held active licenses in seven or more states. As in prior years, male physicians tended to hold slightly more concurrent medical licenses than female physicians [males: an average of 1.9 active licenses; females: an average of 1.3 active licenses.] Many holding multiple licenses, typically males, were engaged in a *locum tenens* type of practice which requires that they move periodically from state to state. On the other hand, many of those holding no other licenses are still in their residency/fellowship training and their current application to Rhode Island represented their first request for professional licensure.

Prior Supervised Training:

Each licensure applicant is required to provide the Board with the nature, location and duration of all supervised clinical education. Male physicians, newly licensed during 1996, averaged 3.8 years of residency training and 0.4 years of fellowship experience for an average total of 4.2 years of supervised clinical education. Female physicians, newly licensed during 1996, averaged 3.5 years of residency training and 0.4 years of fellowship experience for an average total of 3.9 years of supervised clinical education. The small gender differences are accounted for by the fact that those entering certain disciplines requiring more extended hospital training [eg, neurosurgery, hand surgery, reconstructive surgery] were almost always male. When, on the other hand, duration of supervised training in fields such as pediatrics or internal medicine were analyzed, no gender differences could be discerned.

Specialty Distribution:

Table 5 details the self-declared specialties and subspecialties of the newly licensed physicians during the last hemidecade. The frequency rates of those entering primary care medi-

cine fluctuate from year to year but tend to be in the vicinity of 40%, with women physicians more likely to declare this as their intent. In 1995 large numbers of newly licensed physicians entered the subspecialties of internal medicine. In 1996 the number entering these fields has plummeted.

Certain gender differences in the choice of specialties persist. The number of women entering the surgical specialties of orthopedics, neurosurgery, urology and emergency room medicine continues to be small. The number of women entering gynecological surgery, on the other hand, has risen dramatically in 1996.

Table 6 summarizes the locations of the residencies and fellowships pursued by the 1996 group of licensees. 37.4% of these 294 newly licensed physicians trained within Rhode Island while an additional 26.5% received their graduate clinical training elsewhere in New England. Only one physician in this group of 294 received any residency training overseas [in Australia.]

Specialty Board Certification:

The percent of new medical licensees with Board certification in one or more specialties has hovered near 50% for the last few years. [1994: 51.7%; 1995: 51.5%; 1996: 55.1%] Board accreditation in a subspecialty is noted in about 10% of the 1996 licensees [in 1995, it had been 8.7%.] Many of those newly licensed are still in residency/fellowship training and are not eligible to sit for the examinations.

References:

1. Hamolsky M, Aronson S. The practicing physicians of Rhode Island: A statistical profile. *RI Med* 1993;76:347-349.
2. Deary N, Hamolsky M, Aronson S. The practicing physicians of Rhode Island: women physicians. *RI Med* 1994;77:253-255.
3. Deary N, Hamolsky M, Aronson S. Physicians newly licensed in Rhode Island during 1993. *RI Med* 1995;78:44-46.
4. Deary N, Hamolsky M, Aronson S. Physicians newly licensed in Rhode Island during 1994. *RI Med* 1995;78:200-203.
5. Aronson S, Deary N, Hamolsky M. The licensed physicians of Rhode Island in the year 1895. *Med & Health/RI* 1996;79:60-67.
6. Deary N, Hamolsky M, Aronson S. Physicians newly licensed in Rhode Island during 1995. *Med & Health/RI* 1996;79:365-369.

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THE CREATIVE CLINICIAN:
CASE OF THE MONTH

The practice of medicine is an art, not a trade; a calling, not a business ..." – WILLIAM OSLER, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

The Longest Night

Anthony Mega, MD

A 25 year old Caucasian man awakened one night - penis erect, with no antecedent sexual stimulation. When he called a local emergency room, the person on the phone dismissed him as a prankster. Later that day he described his problem on the Internet; a physician from Missouri advised him to seek medical attention immediately. Twenty painful hours after awakening, the man presented at The Miriam Hospital emergency room.

Not surprisingly, the patient complained of significant penile and perineal pain from his sustained erection. He denied dysuria, urinary retention, hematuria. Over the previous two months he had felt increasingly tired - which he attributed to his busy work and college schedule. He had had no chills or sweats, but reported occasional fevers over the last one and a half months. Complaining of early satiety, he said that he had lost 10 pounds over the last month.

The patient had no medical problems and was not on medication. He smoked 1-1/2 packs of cigarettes per day. He denied illicit drug use. He was a homosexual in a monogamous relationship, and he practiced safe sex. The patient is the youngest of four brothers. There was no family history of hemoglobinopathies or hematologic neoplasms.

Physical exam revealed a well developed young man in obvious pain. He was afebrile. Fundoscopic exam was remarkable for venous tortuosity but was without papilledema. There was no adenopathy. Cardiopulmonary exam was normal. Abdominal exam revealed massive splenomegaly with the spleen 9 cm below the left costal margin and extending to the umbilicus. The liver was only mildly enlarged. He had an erect, tender penis and a normal testicular exam. Rectal exam was normal with guaiac negative stools. Neurologic exam was normal.

DIFFERENTIAL DIAGNOSIS

The symptoms pointed to priapism, named for Priapus, the Greek mythological god of fertility - an ironic attribution since 50% of patients with priapism develop subsequent impotence. Priapism is defined as prolonged, painful erection of the penis not relieved by ejaculation.[1] The differential diagnosis has many possibilities. In 20-30 year old men without sickle disease, most cases are idiopathic, post traumatic, or occur after excessive sexual activity. Illicit drugs including marijuana, cocaine, LSD are associated with priapism - but our patient did not report trauma or sexual activity on the night his episode began. He denied use of illicit drugs. Many prescription medications can cause priapism; e.g., papaverine injections for impotence, antipsychotic medications, antihypertensives, corticosteroids, and anticoagulants. Our patient, though, was not taking any medication.

He did have symptoms suggesting a possible underlying systemic disease. He described fevers, weight loss, early satiety; splenomegaly was noted on his exam. Myeloid leukemia, either chronic or acute, can cause priapism when a severe leukocytosis leads to severe hyperviscosity which impairs venous flow. In fact, this patient's fundoscopic exam also revealed venous tortuosity which is commonly seen in hyperviscosity states. Other neoplasms such as lymphomas and retroperitoneal carcinomas and sarcomas can lead to priapism due to mechanical obstruction of venous outflow from the penis. Nothing on physical exam suggested the presence of a pelvic tumor but this remained under consideration.

THE EVALUATION

The initial evaluation of this patient proved diagnostic. The CBC was remarkable for a WBC 430,000 cell/mm,[3] a Hb of 8.3mg % and a platelet count of 346,000 cells/mm.[2] Review of the peripheral blood smear revealed a marked leukocytosis, a normocytic, normochromic anemia and a normal platelet morphology (Figure 1). The WBC differential count was 39% polys, 14% band forms, 18% myelocytes, 14% metamyelocytes, 4% myeloblasts, 4% basophils, 6% nucleated RBC and 1% lymphocytes. Profound leukocytosis with granulocytes from all maturation states seen on peripheral smear most likely represents the myeloproliferative disorder, chronic myelogenous

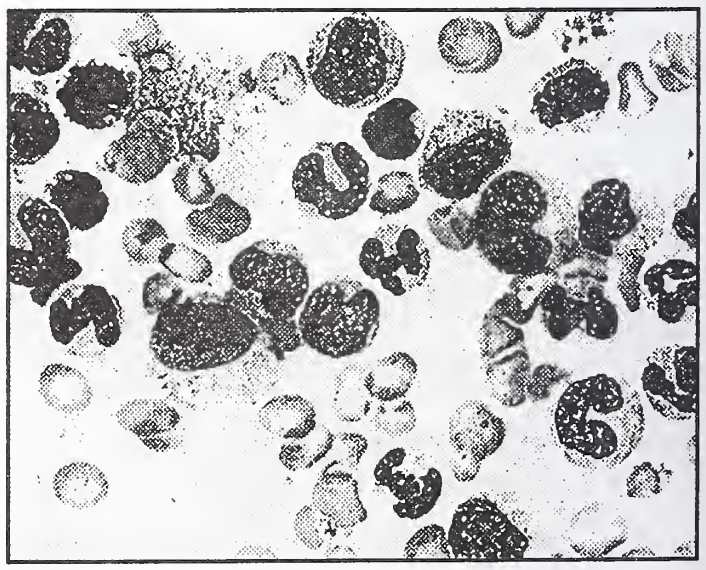

Figure 1

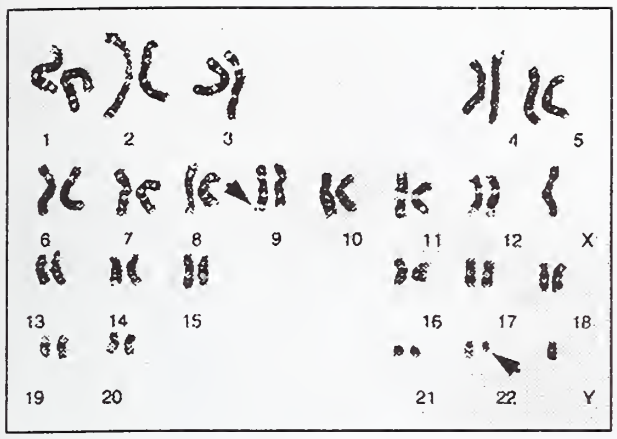

Figure 2

leukemia (CML). The lack of a substantial myeloblast percentage made acute myelogenous leukemia (AML) less likely. Later a bone marrow biopsy was performed with the morphologic and cytogenetic data confirming the diagnosis of CML with hyperleukocytosis/hyperviscosity syndrome leading to priapism.

Discussion

CML is a myeloproliferative disorder characterized by a left shifted peripheral blood granulocytosis, splenomegaly and an asymptomatic chronic phase. Its indolent nature should not lull the physician into complacency. When CML transforms into its accelerated or blast phase, it is one of the deadliest hematologic disorders.

The pathogenesis of CML is well understood. The Philadelphia (Ph) chromosome is the manifestation of the reciprocal translocation of chromosome material between the long arms of chromosomes 9 and 22. This is designated as t(9,22) (q34;q11) and illustrated in our patient (Figure 2). Although the Ph chromosome was first recognized in 1960, not until the 1980's was the specific cellular oncogenesis determined.[2] The translocation leads to the critical fusion of the bcr gene on chromosome 9 with the abl gene on chromosome 22.

The fused bcr-abl is an oncogene which is transcribed into an abnormal, elongated, chimeric mRNA. The result of this abnormal mRNA is a tyrosine kinase enzyme with an increased molecular weight of 210kd (compared to the normal 145kd). The P210 tyrosine kinase has enhanced activity when compared to the P145 enzyme.

How does this chimeric gene product transform normal hematopoietic cells into malignant cells? The oncogenic, unregulated tyrosine kinase localizes to the cytoskeleton phosphorylating target proteins which leads to inhibition of apoptosis, promotion of growth factor independence, and overall cellular expansion. This malignant phenotype is seen in the pluripotent hematopoietic stem cell. In spite of this, only myeloid and megakaryocytic lineages seem to be increased in the bone marrow. Unregulated expansion of these lineages lead to the marked leukocytosis and thrombocytosis that characterizes CML.[3]

In our patient, the resultant hyperleukocytosis increased whole blood viscosity with sludging of venous flow. This is the postulated, but not certain, mechanism leading to priapism. Priapism in CML is known as notoriously difficult to manage; this reputation held true in our patient. Conservative measures (ice pack, hydration) were attempted, but without success. Terbulatine was administered to promote vasodilatation without effect. Plans were made to perform leukopheresis on the patient, but this is seldom effective in CML because it is difficult to remove mature granulocytes from the circulation for a sustained period of time.

With this in mind, our urologic consultant proceeded with a transglandular spongiosum-cavernosum shunt. A urethral catheter was placed to aid the surgeon in avoiding trauma to the urethra. After appropriate preparation and anesthesia, an 18 gauge core needle was placed through the glans into the left corpora cavernosum and 100 cc of unclotted blood were aspirated. A fistula was then created leading to the spongiosum-cavernosum shunt. Immediately the penis detumesced and, the following morning, was flaccid.

Management

Our patient was initially treated with leukopheresis which, as predicted, only transiently lowered the granulocyte count to 300,000 cells mm.[3] He was started on hydroxyurea tablets at 2 grams per day which has been increased to 4 grams per day. His WBC is now under 200,000 cells mm.[3]

Allogeneic bone marrow transplantation is being pursued, depending upon the outcome of HLA-matching of the patient and his siblings. A bone marrow transplant can alter the natural history of CML, but with considerable potential morbidity. Alpha-interferon recently has been shown to be an effective therapy that can eliminate the cells with the t(9,22) abnormality and extend the chronic phase of the disorder. However, in a young patient bone marrow transplantation remains the treatment of choice if a HLA-matched sibling is identified.

One week after presentation, the patient had a spontaneous erection at night. He was grateful that it occurred and even happier that it rapidly resolved.

References

1. O'Brien WM, Connor K, Lynch JH: Priapism: Current Concepts. *Ann Emerg Med* 1989; 8:980-983.
2. Tefferi A, et al. Chronic Granulocytic Leukemia: Recent Information on Pathogenesis, Diagnosis, and Disease Monitoring. *Mayo Clinic Proc* 1997; 72:445-452.
3. Hughes TP, Goldman JM. Chronic Myeloid Leukemia. p 1142. In Hoffman R et al. Eds. *Hematology Basic Principles and Practice.* Churchill Livingstone, Inc., New York,1995.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Hospital Discharges with Asthma, 1991-1995

Jay S. Buechner, PhD

Asthma is a chronic condition suffered by an estimated 10 million Americans and increasing in prevalence.[1] It is more common among children than adults, with an estimated prevalence rate of 7.2% among persons under age 18, compared to 5.1% for all ages, in 1993.[2] Data on discharges from Rhode Island hospitals over a recent five-year period show an increasing mention of asthma diagnoses among inpatients and a disparate proportion of low- income and minority persons among young children with asthma diagnoses.

Over the five year period from October 1, 1990, through September 30, 1995 (hospital fiscal years 1991-1995), there were 23,420 discharges of patients from community general hospitals in Rhode Island with a principal or additional diagnosis of asthma. From 1991 to 1995 (fiscal) the number of such discharges grew consistently from 3,707 in 1991 to 5,463 in 1995, or by 49.3%. By 1995, 4.2% of all discharges had a diagnosis of asthma.

The increase was greater for discharges with asthma appearing as an additional diagnosis (up 83.4%) than for discharges with asthma as a principal diagnosis (8.8%). (Figure 1) In 1991, discharges with asthma as an additional diagnosis comprised just over half of all discharges with asthma (53.9%); in 1995, they were nearly two-thirds (66.4%) of all asthma discharges. Patients with asthma as a principal diagnosis were more likely to be admitted through the emergency department (79.3% of patients) than other patients with asthma (52.3%).

Patients with asthma as an additional diagnosis had principal diagnoses from the entire spectrum of diseases. The most common diagnosis groups reported for these patients are listed in Table 1. Among these diagnosis groups, the rate of increase of discharges with a principal diagnosis of pregnancy (primarily deliveries) or an associated complication from 1991 to 1995 was notably high, at 172%, i.e., nearly tripling in five years.

The rate of hospitalization for asthma was associated strongly with the patient's demographic characteristics. Among females the rate of hospitalizations where asthma was mentioned was much higher (580 discharges per 100,000 population) than for males (338 per 100,000). However, among patients age younger than 15, the large majority were males (62.8%); among those ages 15 and older, females dominated (71.9%).

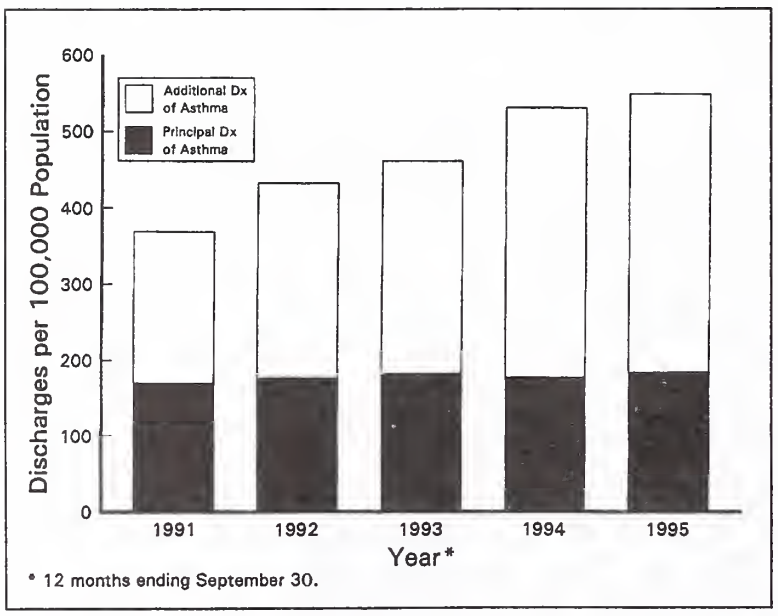

Figure 1. Hospital Discharges with Diagnosis of Asthma per100,000 Population, by Year of Discharge, Rhode Island, October 31, 1990 - September 30, 1995.

Table 1.

Principal diagnosis of patients with asthma as an additional diagnosis, 1991-1995.

Principal Diagnosis	Percent
Diseases of the respiratory system	18.4%
Disease of the circulatory system	14.7
Pregnancy and associated complications	11.6
Diseases of the digestive system	9.9
Signs and Symptoms	7.0
Injury/poisoning	6.7
Neoplasms	5.3
Diseases of the genitourinary system	5.0
All others	21.4

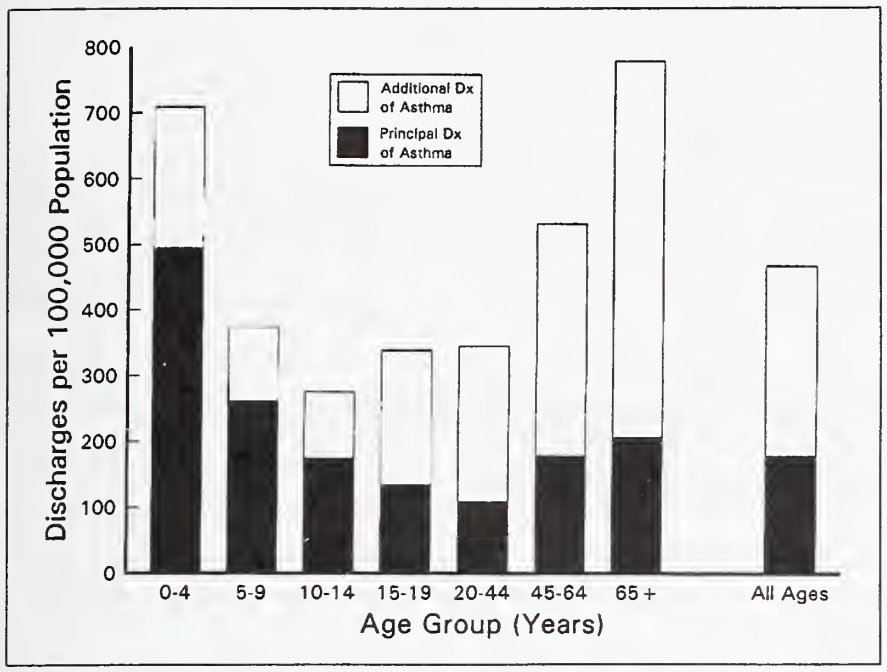

Figure 2.
Hospital Discharges with Diagnosis of Asthma per 100,000 Population, by Age of Patient at Admission, Rhode Island, October 31, 1990 September 30, 1995.

Females also showed a much higher rate of increase in the number of asthma discharges over the period (up 61%) than did males (up 13%).

The very young and the very old were at greatest risk of hospitalization with asthma. (Figure 2) The discharge rate for the youngest age group, 0 to 4 years, was similar to that for the oldest group, 65 years and over, but the asthma

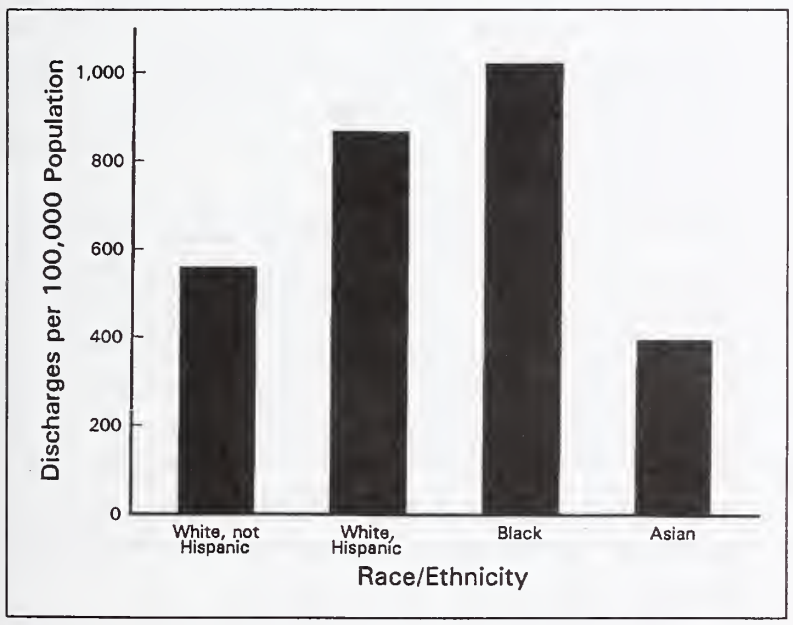

Figure 3.
Hospital Discharges with Diagnosis of Asthma per 100,000 Population, by Race and Ethnicity, Ages 0 to 4 Years, Rhode Island, October 31,

diagnosis among the youngest patients was far more likely to be a primary diagnosis than was true among the oldest patients. In the youngest age group, the discharge rate increased by 67%, more rapidly than the increase of 49% for all ages. The young patients included a substantial majority (67%) of males and over- representations of Hispanic and black children. (Figure 3) Also over- represented were children whose homes were in census tracts described as poverty areas; 41% of asthma discharges in this age group resided in poverty tracts, compared with only 15% of the state's population of all ages, according to the 1990 Census.

In summary, a growing percentage of hospital inpatients are reported as asthmatic in recent years. Although during this period there was an overall increase in the propensity of hospitals to report multiple diagnosis codes on the hospital discharge database (the average number of diagnoses reported per discharge rose from 3.5 in 1991 to 4.3 in 1995), the large increases in the number of patients with asthma are likely reflective of a rising prevalence of asthma in the state. The patterns seen in the analysis of hospital discharge data suggest that asthma is disproportionately affecting young males and older women and increasing rapidly among pregnant women. Among the youngest children, the burden of this disease is falling most heavily on minority children and children residing in poverty areas.

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References

1. Public Health Service. Healthy People 2000: *National Health Promotion and Disease Prevention Objectives.* Washington, DC: U.S. Dept. of Health and Human Services. DHHS Pub. No. (PHS) 91- 50212. September 1990.–
2. Benson V, Marano MA. Current estimates from the National Health Interview Survey, 1993. National Center for Health Statistics. *Vital Health Stat* 10(190). December 1994.

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PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Physicians Dumping Iron

Joann M. Lindenmayer, DVM, MPH

Recognized over a century ago by the striking bronze to gray skin color of most affected persons, hemochromatosis was originally thought to be caused by deposition of a blood pigment (Gr, *haima, chroma*) in the skin. Although this unusual skin color is now known to be caused by deposition of iron, the name hemochromatosis (HC) has persisted. Hemochromatosis is now known to be an autosomal recessive condition associated in most cases with an abnormal HLA-H gene located near the HLA-A3 Major Histocompatibility Complex locus on chromosome 6. Although the protein associated with this gene has not yet been identified, it causes a functional inability to downregulate intestinal iron absorption even when body iron stores are high, leading to a condition known as iron overload (IO).

Medical Aspects of Hemochromatosis

Most iron in the body is bound to three proteins. Porphyrin in hemoglobin and other respiratory pigments makes iron available for biologic use; transferrin transports iron in the blood, and ferritin is used to store iron in parenchymal cells of the liver, spleen, and bone marrow and in plasma. The body of a healthy adult male contains approximately 4 grams of iron, 50% in hemoglobin, 25% in ferritin, and 25% among other cells of the body. Healthy young people and women of reproductive age store much less iron because of the demands of growth and reproduction.

The body controls iron stores primarily through absorption. Average dietary iron intake is 10-20 mg/day. Of that, 1-2 mg is absorbed, although up to 5 mg can be absorbed under conditions of iron deficiency. The only means of eliminating iron is by shedding exfoliated epithelial cells and blood loss. People with HC absorb twice the normal amount of iron and accumulate between 300 and 3000 mg of iron annually. When iron saturates transferrin, nontransferrin-bound iron enters cells and is stored in parenchymal cells of the liver, pancreas, heart, thyroid, and adrenal glands. In these organs iron causes damage via free radical-mediated peroxidative reactions that lead to the development of cirrhosis, diabetes, heart failure, reproductive failure, and arthropathy.

Abbreviations Used:

CAP	College of American Pathologists
HC	Hemochromatosis
IO	Iron overload
TS	Transferrin

Several laboratory tests are currently in use for the diagnosis of IO. Current guidelines issued by the College of American Pathologists[1] (CAP) recommend use of the transferrin (TS) test as an initial screening test. Transferrin saturation, in the absence of other disorders that can affect iron transport, is a sensitive indicator of early iron overload. Because levels of TS are subject to diurnal variation, the CAP recommends it be performed twice, nonfasting in the first instance and fasting in the second. Two TS values greater than 60% for adult males and 55% for adult females are suggestive of iron overload and should lead to measurement of serum ferritin concentration. If that too is elevated, confirmation of IO is achieved by demonstrating excess stainable iron in liver parenchymal cells and a hepatic iron index of > 2.0 umol iron/gram dry weight/age in liver biopsy specimens. For persons unwilling to undergo liver biopsy, diagnosis can also be achieved by quantitative phlebotomy, although this provides no information about the condition of the liver. All tests for IO are most useful in adult males, less so in females and younger people.

Only 50% of males and 10% of females who are homozygous for HC actually express clinical disease. Clinical HC is typically diagnosed in men in their forties, in women after menopause, and rarely in younger people and women of reproductive age. It appears that clinical expression of HC may be altered by other factors that include dietary iron intake, alcohol consumption, and use of vitamin C.

Clinical HC appears when body stores reach 20-40 g iron. Clinical signs are most commonly seen in homozygotes and include cirrhosis, diabetes, arthropathy, cardiomyopathy, gonadal dysfunction, and bronze skin. People with cirrhosis are 20 times more likely to develop hepatocellular carcinoma, and twice as likely to develop colon cancer, than

are people without cirrhosis. Death almost always occurs when body stores reach 60g. Clinical signs are less common among heterozygotes, although minor phenotypic expression may be noted. Male heterozygotes have moderately but statistically significant elevations in their risk for diabetes, colorectal cancer, liver cancer, and hematologic malignancy; females have elevations in their risk for stomach cancer.[2]

The 10 year survival rate for people with untreated, clinically apparent IO is 6%. Iron overload is preventable and treatable with therapeutic phlebotomy. Removal of excess iron in persons suffering from IO may be as frequent as 4 units of blood (800 mg iron) a week for up to a year during the induction stage. After that, therapeutic phlebotomies can be performed 4-6 times a year to maintain iron stores at normal levels. Therapeutic phlebotomy can lead to a normal life expectancy in persons who have yet to develop clinical hemochromatosis. In persons who have developed cirrhosis, ten-year survival rates are 47-75%, a large improvement over no treatment. In addition to improvements in life expectancy, treatment can lead to improved cardiac function, improved carbohydrate tolerance in insulin- dependent diabetics, improved hepatic function, and decreased skin pigmentation. Treatment has little or no effect on improvement of sexual function and arthropathy. Current blood bank policies in the U.S. specify that "blood withdrawn in order to promote the health of a donor...shall not be used as a source of whole blood unless the container label conspicuously indicates the donor's disease that necessitated withdrawal of the blood." (21 CFR Ch. 1(4-1-93 Edition) §640.3 (d)). This results in the dumping of blood obtained from persons with hemochromatosis.

Epidemiology of Hereditary Hemochromatosis

The HLA-H gene for HC was cloned in 1996. Prior to this, HC was thought to be a rare condition. It is now known that one of every 8-9 people, or approximately 30 million people in the U.S., carries at least one allele for the gene. Approximately 1.25 million people are homozygous for the condition, making HC the most common genetic defect in the US population.[3] Although the male:female ratio for homozygosity is 1:1, florid hemochromatosis is 5 times more common in men than in women. The HLA-H gene is primarily found in persons of European ancestry. The prevalence of clinical hemochromatosis among people of African-American ancestry is low - only 5% of cases have been linked to this genetic defect, making it likely that some other genetic defect may be responsible for the condition in persons of African-American descent.

Public Health Implications of Hereditary Hemochromatosis

The Centers for Disease Control and Prevention recently established a HC program. One aim is to educate physicians and the public so that hemochromatosis is no longer considered to be a rare condition. A second objective is to provide an epidemiologic approach to HC, since many basic science issues must be worked out before screening can be implemented on a population basis.

Hemochromatosis is a good candidate for the development of screening strategies for several reasons. Undiagnosed IO confers a significant burden of morbidity and mortality upon people who are affected. Early diagnosis is possible and treatment at this stage can prevent the development of clinical IO or attenuate its clinical expression. Nevertheless, among the research questions to be answered are: What is the relationship between phenotype and genotype in iron overload disorders? What is the optimal strategy for screening for IO? What is the cost effectiveness for screening for IO? What are the ethical, legal, and social implications of screening for hemochromatosis with a genetic test?

In addition, new understanding about the prevalence of HC raises questions concerning the wisdom of fortifying foods with iron, focuses attention on the particular needs of persons with HC for counseling about the dangers of alcohol consumption, and reinvigorates efforts to overturn blood bank policies that prevent the use of blood from HC patients.

Furthermore, HC serves as a model for other genetically-linked diseases and conditions of adult, rather than pediatric onset. The CDC recently convened a task force to develop a strategic plan for "Translating Advances in Human Genetics into Public Health Action." Advances in genetic research, largely products of the Human Genome Project of the National Institutes of Health, will challenge medical and public health institutions in the years ahead.

References

1. Witte DL, Crosby WH, Edwards CQ, et al. Practice Guideline Development Task Force of the College of American Pathologists. Hemochromatosis. *Clinica Chemica Acta* 1996;245:139-200.
2. Nelson RL, Davis FG, Persky V, Becker E. Risk of neoplastic and other diseases among people with heterozygosity for hereditary hemochromatosis. *Cancer* 1995;76:875-9.
3. McLaren CE, Gordeuk VR, Looker AC, et al. Prevalence of heterozygotes for hemochromatosis in the white population of the United States. *Blood* 1995;86:2021-7.

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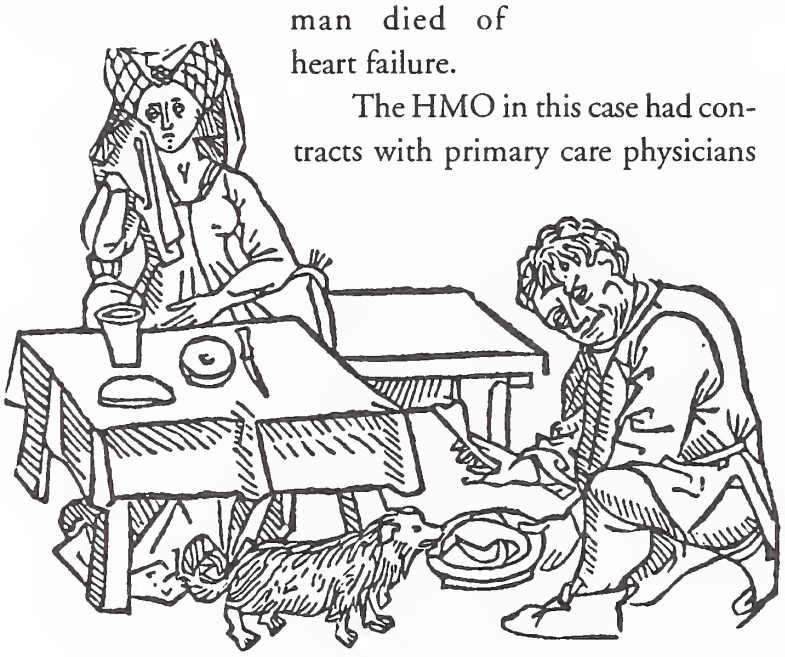
Judicial Diagnosis

How Much Does a MCO Enrollee Need to Know about Provider Financial Incentives?

Michele B. Lederberg, JD, MPH

John and Jane Q. Patient, enrolled in a Health Maintenance Organization (HMO), regularly consult primary care physicians, who act as "gatekeepers," deciding when to refer Mr. and Ms. Patient to specialists. What must a Health Maintenance Organization (HMO) tell enrollees about the "incentives" paid to primary care physicians to minimize those referrals?

As the debate continues concerning the legal obligations of HMOs and other managed care organizations (MCOs) to disclose information to their enrollees, a federal appeals court has added a new twist. In February, an appeals court in the Eighth Circuit ruled that an HMO must disclose any incentive plans used to encourage primary care physicians to minimize referrals to specialists. In *Shea v. Esensten,* a forty year-old man enrolled in a HMO complained to his primary care physician of chest pains, shortness of breath, muscle tingling and dizziness. The physician, who knew of the man's family history of heart disease, refused to refer him to a specialist - claiming that the man's youth and symptoms did not justify a referral. A few months later the man died of heart failure.



The HMO in this case had contracts with primary care physicians that were designed to minimize referrals: if a physician made too many referrals to a specialist, the HMO docked a portion of the physician's fee. On the basis of this incentive plan, the man's widow brought suit against her husband's physician and his HMO, claiming that if her husband had known that his physician could earn a bonus from the HMO for limiting referrals, her husband would have disregarded his physician's advice and consulted a specialist.

In particular, the court in Shea v. Esensten *found that because patients normally rely on their physicians' advice, patients have the right to know whether that advice is influenced by, in the court's words, "self-serving financial considerations."*

The court ruled that the HMO had a fiduciary duty under the Employee Retirement Income Security Act of 1974 (ERISA) to disclose the financial incentives offered to physicians to discourage specialist referrals. In particular, the court found that ERISA, which regulates the administration of most health benefit plans, imposes a duty on a plan fiduciary (the entity that exercises discretionary authority in the administration of an employee health benefit plan, usually the insurer or MCO) to discharge its duty solely in the interests of the enrollees. In short, the patients' interests should prevail. As part of this duty, the fiduciary must notify an enrollee of "material facts" which could adversely affect him/her - and the existence of a financial incentive plan designed to minimize specialist referrals constitutes a "material fact." In particular, the court found that because patients normally rely on their physicians' advice, patients have the right to know whether that advice is influenced by, in the court's words, "self-serving financial considerations." Based on the existence of this obligation, the court remanded the case to the lower court for further proceedings.

Subsequent to the court's decision in *Shea v. Esensten,* a bill was introduced in the United States House of Representatives which addresses the same issue. This bill would prohibit MCOs from penalizing any health care provider because the provider (i) offers patients a specialist referral,

(ii), discusses with patients any medically necessary care or treatment options, and/or (iii) discusses with patients any financial incentives or other financial arrangements between the provider and the MCO. Under this bill, a physician would have the opportunity to speak freely to a patient not only concerning treatment options, but also incentives used to minimize referrals. This bill would not, however, mandate disclosure by a provider or impose any obligation-to-disclose on an MCO, as required by the court in *Shea v. Esensten* At this time, the House of Representatives has not taken action on the bill.

In the meantime, it is too early to tell whether the court's decision in *Shea v. Esensten* will affect MCOs in Rhode Island for two reasons.

First, *Shea v. Esensten* was decided in another circuit, and the court's decision is not binding on Rhode Island (or Massachusetts) courts. However, when faced with a case of first impression, especially concerning ERISA, federal courts frequently consider the rulings of courts in other circuits. Therefore, if a federal court in Rhode Island were faced with a suit similar to that in *Shea v. Esensten*, the Rhode Island federal court might look to the Eight Circuit's court decision for guidance.

Second, the impact of the court's decision in *Shea v. Esensten* may not be felt as strongly in Rhode Island as elsewhere because of the new state Health Care Accessibility and Quality Assurance Act (the "Quality Assurance Act"). This state statute targets health plans in Rhode Island (including ones operated by an HMO, insurer, hospital, medical or dental service plan) that uses incentives to steer enrollees to a limited provider network (usually by reimbursing more of the cost than for visits to providers outside the network). These plans must notify prospective and current enrollees of capitation or risk-sharing financial arrangements with providers. A health plan must select one of the following options for disclosure: (i) the health plan uses capitation or other risk sharing arrangements with providers; (ii) the health plan *may* use capitation or other risk sharing arrangements with providers; or (iii) the health plan does not use capitation or other risk sharing arrangements with its providers. Although the disclosure statements do not require a health plan to notify enrollees of its payment arrangements with contracting providers, the existence of this disclosure obligation alerts patients: incentives may exist that can influence specialist referrals. This would allow a patient to question a health plan or physician about the particular payment incentives.

A health plan's disclosure obligations are further complicated by ERISA. Because ERISA preempts the application of a state statute to an employee benefit plan (unless the statute regulates the business of insurance), a court could find that ERISA preempts the Quality Assurance Act as it relates to employee benefit plans in Rhode Island. If a court were to find ERISA preemption, an MCO in Rhode Island would *not* be required to disclose information on financial arrangements with providers to its enrollees - unless the First Circuit were to rule in a manner similar to the court in *Shea v. Esensten.*

To achieve uniformity, ultimately Congress must clarify the "disclosure" obligations of physicians and MCOs. Meanwhile, John and Jane Q. Public can justifiably wonder whether finanical incentives exist to discourage their physicians from making referrals to specialists.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	February 1997	12 Months Ending with February 1997	
	Number	Number	Rates
Live Births	968	13,492	13.6*
Deaths	848	9,925	10.0*
Infant Deaths	(11)	(79)	5.9#
Neonatal deaths	(9)	(62)	4.6#
Marriages	419	8,057	8.1*
Divorces	231	3,260	3.3*
Induced Terminations	441	5,634	417.6#
Spontaneous Fetal Deaths	44	899	66.6#
Under 20 weeks gestation	(35)	(825)	61.1#
20+ weeks gestation	(9)	(74)	5.5#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	August 1996	12 Months Ending with August 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	246	3,219	325.1	4,438.0
Malignant Neoplasms	207	2,548	257.3	7,069.0
Cerebrovascular Diseases	41	582	58.8	801.5
Injuries (Accident/Suicide/Homicide)	34	336	33.9	5,996.5**
COPD	34	369	37.3	242.5

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

THE RHODE ISLAND MEDICAL JOURNAL

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Ninety Years Ago

[August, 1907]

Herbert Terry, MD, describes his experiences with three cases of kidney stone: the largest was 90 grains in weight and consisted entirely of oxalate of lime. The author describes his surgical procedure for the removal of calculi situated in the renal pelvis, including certain modifications which he has made. The article is marked by a unique degree of candor in sentences such as, "I may have operated on the wrong kidney."

Robert F. Noyes, MD, discusses the measurement of blood pressure noting that good clinicians had detected pressure changes by palpation of the radial pulse long before the sphygmomanometer had been invented. He summarizes the various technical advances in providing a portable instrument to quantitate arterial pressure in the patient beginning with Baush's 1876 instrument. He notes that the currently popular instruments depend upon arterial compression by a broad band encircling the arm. He then proceeds to indicate the normal limits of systolic pressure [up to 130 in the young male and up to 175 in the elderly male.] No mention is made of diastolic pressures, their measurement or prognostic significance. The author lists those physiologic states and pharmacological agents which either elevate or depress systolic pressures. Finally, he notes the grave dangers of prolonged hypertension and summarizes the available therapies including cardiac depressants and vasodilators such as chloroform, venesection, purgation, amyl nitrate, nitroglycerine and potassium iodide.

The Roentgen anatomy of the epiphysis is described in detail by Roland Hammond, MD, who concludes: "The epiphyses should always be remembered and their frequent involvement in the joint injuries of childhood. Their normal appearance on the Roentgen plate should be familiar to everyone and it would not be a bad idea for each practitioner to have a set of Roentgen plates or pictures to which he might refer as he would to his book of anatomy." The article is unique in that it is profusely illustrated with X-ray images.

Dr. Charles V. Chapin reports on the health of Providence, noting the high incidence of meningitis during April and May, ten new cases of typhoid and the diminishing number of rabid animals captured.

NOTICE NOTICE NOTICE NOTICE

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The Office of Outreach Programs at Rhode Island College trains Medical Assistants. Funded by the federal JPTA program, the program targets dislocated workers and recipients of public assistance.

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Fifty Years Ago

[August, 1947]

Chester Keefer, MD, summarizes the use of antibiotic agents in clinical medicine with particular reference to the varied uses of amorphous penicillin, penicillin G and penicillin in beeswax. The relative merits of oral vs. parenteral administration are also discussed. The author then considers his experiences with streptomycin in cases of tuberculosis. He concludes that the drug has great merit but that it is too early to determine whether, by itself, it can effect total cures. He notes, in passing, the relationship of streptomycin therapy and deafness.

Malcolm J. Farrell, MD, discusses psychiatric problems learned in the US Army. He stresses the critical importance of preventive interventions, noting that "early treatment is tantamount to early recovery." He concludes: "We failed to imbue in many the fervors and convictions that would enable them [the recruits] to withstand the rigors and unpleasantness of military life. Too long we stressed the rights and safety of the individual, at the same time giving little thought to the rights and security of the group."

Trends in part-time industrial health services are noted and outlined by Crit Pharris, MD. It is now essential, says the author, to demonstrate the advantages of modern health care through good individual plant programs and group participation in efforts to further enlighten industry and labor.

Twenty Five Years Ago

[August, 1972]

David M. Barry, MD, discusses the neurosurgical treatment of anterior cerebral and anterior communicating artery aneurysms. His paper is based upon a personally-observed series of 36 patients who had experienced subarachnoid hemorrhage secondary to a ruptured aneurysm; each had been treated by proximal clipping of the main anterior cerebral artery. There were three deaths and three patients with reversible postoperative complications in this series of cases.

The management of head injuries in the emergency room is discussed by Franco Erculei, MD. He considers soft tissue injuries, closed head injuries with coma and open-head injuries with associated coma. Therapies, local and general, are evaluated and the roles of antishock therapy and the respirator are considered.

James O. Menzoian, MD, David L. Brook, MD, Peter J. Deckers, MD, Philip R. Elia, MD, and Harold Harrower, MD, discuss bilateral hip disarticulation with total thigh flaps in a a 38 year-old male with extensive decubitus ulcerations.

Childbirth
Japanese painting (ink and gold on canvas). Yamato-e school. Fourteenth century.
Institute of Chinese Art, Washington, D.C.

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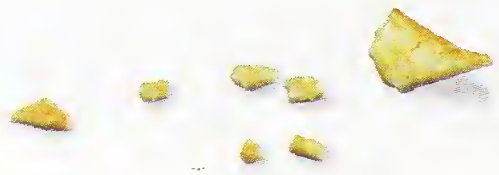

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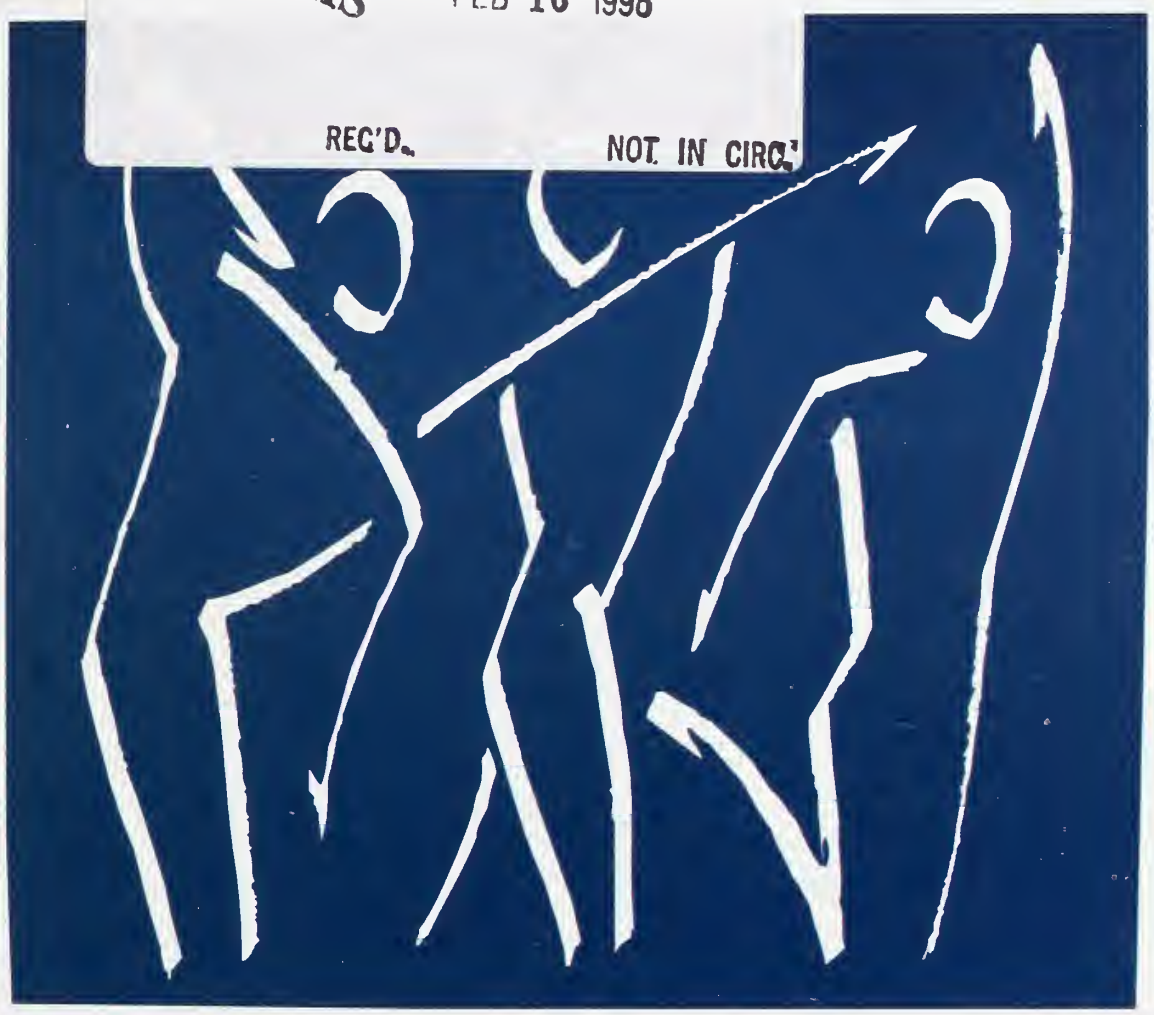

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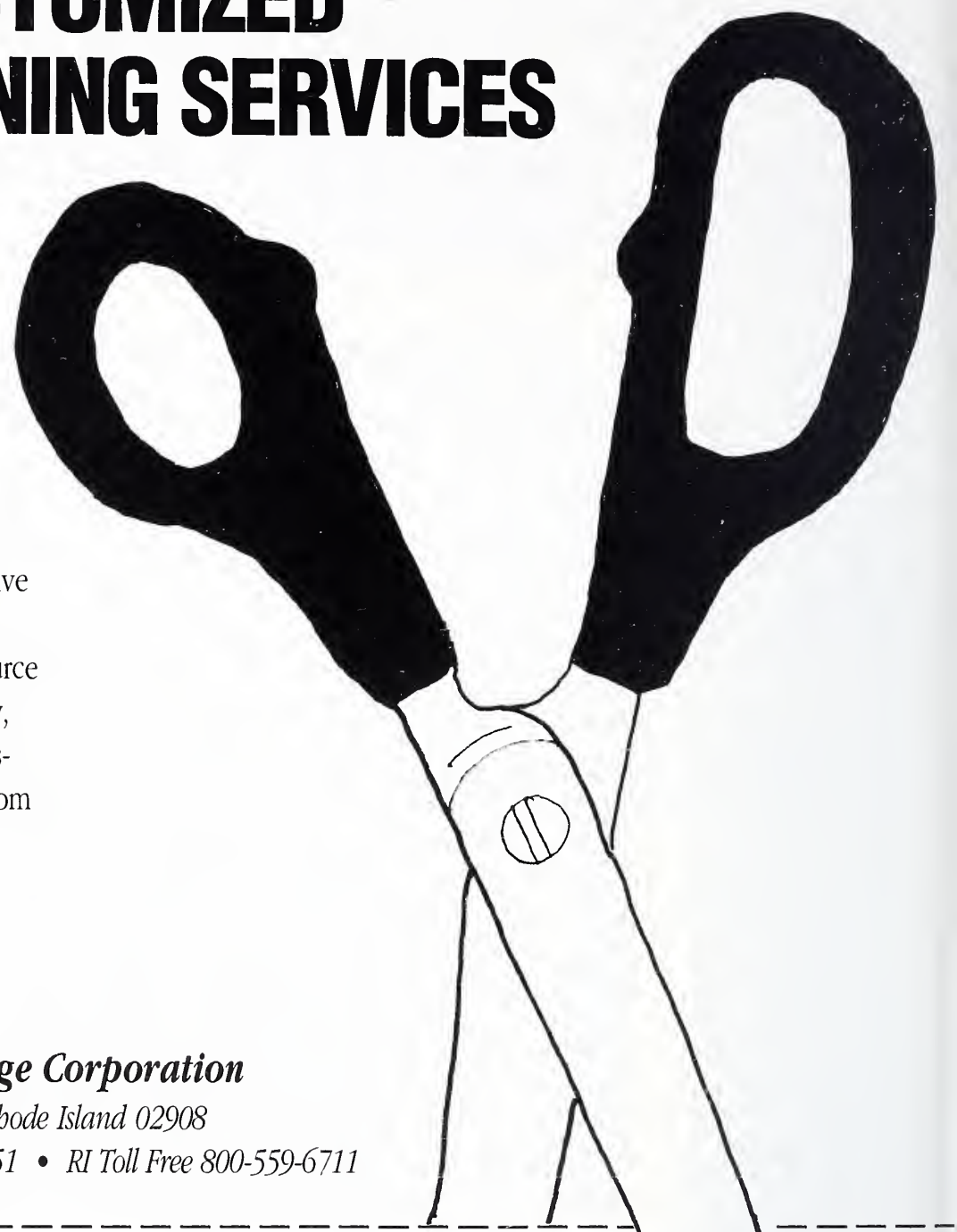

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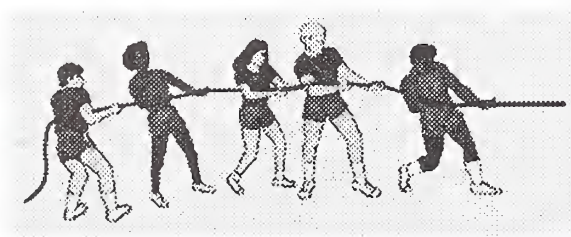
COMMENTARIES

Who Stole Our Fitness and How Do We Get It Back?

In the "good old days," Americans were more physically active and fit than today. Who stole our fitness? Was it Guglielmo Marconi who, in 1895, first broadcast messages through the airwaves by radio? This pioneering effort led over subsequent decades to entertaining radio, informative television, and a nationwide preference to become couch potatoes with eyes glued to seductive television screens.

Was it Henry Ford? In 1908, Ford began to mass produce the Model T. This move to mechanize our lives deprived us of more of our routine physical activity which in preceding years had taken us walking about town or bicycling to meet neighbors and friends. Was it Black and Decker and similar companies with the corporate genius to motorize everything from washing clothes to beating batter? Or, more recently, have mesmerizing computer screens disabled us?

From 1900 to 1997, the mechanization of America has produced a steady decline in muscle activity in favor of an epidemic of sedentariness. As a companion to reduced energy utilization, food consumption has increased. The resultant caloric imbalance has fueled a second epidemic—millions of Americans are seriously overweight. The caloric imbalance required to produce a weight gain of 1 pound each year, 10 pounds in a decade, and 30 pounds of excess weight between the ages of 20 and 50 is less than 10 calories per day. These dual epidemics contribute to many diseases—diabetes mellitus, hypertension, stroke and coronary heart disease being notable examples.



The good news is that we can reverse this trend. The groundbreaking 1996 Surgeon General's Report, *Physical Activity and Health,* documents the health benefits from participating regularly in physical activity.[1] The evidence shows that even moderate physical activity helps prevent or ameliorate the effects of heart disease, hypertension, diabetes, osteoporosis, arthritis, mental and emotional stress, and some cancers. Regular physical activity not only reduces the risk of disease but also helps control weight, strengthens bones and muscles, and promotes an overall feeling of well-being.

In many ways physical activity seems like a miracle drug that holds the promise of better health to all, young and old alike. If exercise were a pill, we would all want to take it. Unfortunately, it is not that easy; developing a regular practice of physical activity requires a concerted, sustained effort. Individuals face a continuum. On one end, they contemplate change; on the other end, they adopt it. Similarly, on one end they sit around; on the other end, they are active. To move individuals along this continuum from contemplation to action, both the milieu supporting sedentary lifestyles and personal health habits must change .

In Rhode Island, the *Move It! Campaign* is underway to provide both environmental and individual support for increased levels of physical activity among people who are sedentary. This campaign is sponsored by The Rhode Island Prevention Coalition, a newly established public/private partnership of agencies interested in health promotion. The Coalition, which has made increasing the state's level of physical activity its first goal, will provide grants to innovative programs that encourage inactive people to get moving, and will sponsor a public education/media campaign with the slogan, *"Move It Your Way! Move It Any Way! Just Move It!"*

The *Move It!* Campaign is intended to foster change in activity levels at the community and population-based level. At the individual and family level, physicians can play an important role in tipping the balance toward physical activity, although incorporating lifelong moderate physical activity in our pharmacopeia for patients is clearly a challenge. The pressures in everyday practice make it difficult to spend time discussing the importance of behavior changes like increasing physical activity and improving diet. However, new concepts of how and why people develop and change behavior patterns provide a framework for effective behavioral intervention. If we can find ways of assessing a patient's readiness to change, we can tailor interventions that patients will accept.

This issue of *Medicine & Health: Rhode Island* is dedicated to reinforcing for providers the notion that physical activity is one of the most important health promoting behaviors that individuals can adopt, and that the medical community can spur adoption of such behaviors. The first article profiles what we know about two Rhode Island subgroups: the physically active ones, and the sedentary ones, who are at higher risk for a range of chronic diseases. Next, a compendium of articles examines the benefits of physical activity in relation to specific chronic disease conditions, along with the potential barriers to physical activity, which providers and patients must address. The final articles discuss both

the challenges to, and value of, provider counseling in encouraging behavior change among patients. While physicians may feel it is an uphill battle to get patients to adopt more positive health behaviors, the data show that physicians can help effect change. It is important that neither the provider nor the patient get discouraged. Our task is to increase awareness of the value of exercise and decrease the perception of barriers to change.

We particularly want to draw your attention to the insert in the center of this issue. It offers practical exercise guidelines that you can copy and give your patients. Also attached is a stamped, self-addressed postcard asking you for a quick evaluation of the utility of the information provided in this issue and a registration card to sign up for a special curriculum for physicians which offers training and tools for counseling patients on increasing physical activity. We strongly encourage you to return these postcards to the Department of Health. Your input and interest will help guide our plans as we work with you to make Rhode Island a state that moves and shakes. Join the Rhode Island Department of Health and the Rhode Island Prevention Coalition in the *Move It!* challenge, and let's get Rhode Islanders moving!

– Richard A. Carleton, MD
– Patricia A. Nolan, MD, MPH

References

1. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.

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Broadening Our Approach Among Diverse Populations

Of all the regimens and therapeutic prescriptions in medicine, exercise, which is fun, healthy, and almost universally effective, is the one most patients (and physicians) love to hate. What is it about physical activity that makes us feel this way? Why does our society grow more sedentary as we learn more about the benefits of physical activity?

As physicians, we pride ourselves on our role as advocates for our patients. We teach them about medicines and surgery, spending hours a week explaining the rationale for specific therapies. However, how many of us have spoken to our patients for more than a few minutes about the need for exercise? How many have discussed the benefits, risks and complications of an active life? How many of us have reviewed a list of alternative physical activities, their caloric expenditures, and the applicability of such activities to each individual? These questions are rare in routine examinations; instead, we wait until after our patients have developed complications related to inactivity to encourage them to be physically active. Worse, we sometimes simply write a prescription for one of the new miracle diet pills or a pill to control hypertension without a prescription for exercise and hope that this will fulfill our responsibility. The desire for an easy fix and instant gratification are the biggest barriers that both physicians and patients face in trying to deal with the epidemic of sedentary lifestyles that has gripped the country.

A sedentary lifestyle is a risk factor for many poor health outcomes, such as cardiovascular disease, diabetes mellitus and obesity. Our ability to drive home the message that physical activity is the best medicine is impaired by the beliefs and perceptions of our patients. This impairment is most pronounced when we encounter patients from different cultures and poor socioeconomic backgrounds. Unfortunately, these populations are disproportionately affected by the poor health outcomes that are related to sedentary lifestyles. Among Rhode Island residents surveyed by the state Department of Health from 1989-1992, 31% of African Americans, 40% of Hispanics, and 34% of other minority respondents reported no leisure-time physical activity - compared to 28% of Whites.

The most universal obstacle in effecting lifestyle changes in populations living in poverty is their fatalistic attitude. This cuts across racial and ethnic barriers. In particular, many adolescents living in urban poverty do not expect to live past the age of 25 or 30. Often they ask, why should I exercise and live a healthy life if my circumstances are not going to change? The health professional must recognize

and deal with this attitude directly; it affects not only the professional's ability to impart healthy messages, but also the patient's compliance with prescribed therapy.

This attitude will not change with a few kind words from the health care provider; we must struggle with our patients to change this viewpoint. Each pound the patient loses, every small reduction in blood pressure, has to be celebrated as a victory. We must reinforce our patients' pride in themselves. When faced with failure, our own frustrations and hopelessness must not be shared with our patients. We must be the cheerleaders of a team that may be last in the standings, but has its eyes on the prize at all times. For many, this kind of interaction can make all the difference in the world. For some, it could be the only source of hope in a hopeless environment.

Sometimes patients want to engage in increased physical activity, but their environments make physical activity hazardous or even impossible. Individuals with low incomes become discouraged when told to participate in tennis, swimming, racquetball, or basketball if facilities and the requisite equipment are not readily available in their communities. Activities requiring little equipment such as walking or jogging may not be feasible if patients find themselves in the crossfire of urban violence and crime. Even if crime is not an issue, the physical environment may be hazardous. In the U.S., minority populations are more likely to live in urban areas with poor air quality.

We must find what resources are available to our patients, what they do for fun, and what opportunities they have to engage in physical activity. People working two jobs to support their families will laugh at you if you ask them to join a basketball league. Your message may be better received if you acknowledge their lack of time to exercise and suggest activities that can be performed throughout the day to reach the same goal. For example, using the stairs instead of the elevator, walking around the block a few times during lunch hour, jogging in place at home for 30 minutes before dinner, jumping rope, vigorous gardening and house cleaning are all activities that will help patients achieve their fitness goals without the need for expensive equipment or facilities. We need to tell them that such activities will provide the same health benefits as would exercising with a personal trainer at a country club.

Finally, the most difficult barriers to overcome are cultures that traditionally have not recognized exercise as an essential part of life, or obesity as a problem. Many immigrants come from agrarian backgrounds where individuals obtained their exercise from field work, not from prescribed exercise. For many, particularly women, the notion of exercise and sweat is distasteful, especially if done in public. Because of the association between exercise and body composition, the different concepts of ideal body weight held by individuals of various ethnic backgrounds are also problematic. This difference in perception is shown by patterns in the use of Norplant, the progestin contraceptive implant. Studies conducted in this country found that although women from diverse ethnic backgrounds discontinued the use of the implants as a result of weight changes, the perception of these changes varied according to the ethnic group. Non-Hispanic women discontinued the implants because of weight gain, while Hispanic women discontinued the implants because of weight loss.[1] However, because physical activity offers health benefits above and beyond those related to weight loss, it is important to stress the benefits of an active lifestyle to all patients, regardless of issues related to weight and obesity.

Finally, as physicians, we must try to practice what we preach. Do as I say and not as I do makes for non-compliance and failure. Being judgmental and chastising patients for failing to achieve is a sure prescription for failure. By placing ourselves in the shoes of our patients and sharing those experiences with them, we will be more effective in the delivery of our messages. Instead of saying "Do this to be healthier," it is more effective to say "This is what I have found effective in my own struggle to get active."

The closer we get to our patients, the more sensitive our ear will become to their whispers. We must take the time to know our patients and the circumstances surrounding their lives. Only by analyzing each individual's situation are we going to achieve the goal of motivating our patients to healthy lifestyles.

– Pablo Rodriguez, MD

References

1. Sivin I. International experience with Norplant and Norplant2 contraceptive. *Stud Fam Plann* 1988;19:81-94.

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New England's Other Webster

The Websters of New England were few in number but conspicuous in their enduring influence upon a young, brash and growing United States. Daniel, from New Hampshire, fearlessly debated the Federalists, the Whigs and the Devil; while Noah, from Connecticut, invested his energies in educational reform, lexicography and studies upon the nature and dynamics of pestilential disease. Historians have regarded Noah as one of this nation's great polymaths; and, because of his extensive writings on the kinetics of infectious disease, as this country's first clinical epidemiologist.

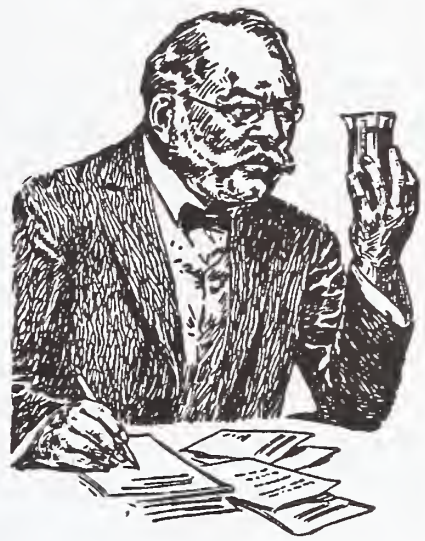
Noah, son of a part-time weaver and farmer, was born in Hartford on October 16, 1758. He was six generations removed from John Webster, one of the religious dissidents who had settled in the wilderness of central Connecticut in 1656. His mother was a direct descendant of William Bradford. Noah attended Yale, the first in his family to be so privileged. On brief leave from his studies, and in the company of his father and brothers, he fought against the red-coated armies of Burgoyne at Ticonderoga.

In 1781 he was admitted to the bar but within a year switched to school teaching in rural New York. In the years following the Revolution, there was an utter paucity of locally generated textbooks, particularly elementary school books which recognized the special character of the American form and usage of English. To rectify this, Webster authored a series of unique school books standardizing the spellings, grammar and pronunciations which had evolved in the newly formed nation. His books [called the Blue Books by generations of elementary school students] served to regularize a haphazardly unsupervised language. They were widely accepted and for much of the 19th century, competed with the Bible as the best-selling volumes in the United States.

Webster's newly won financial independence allowed him to conduct an astonishing variety of scholarly pursuits including banking reform, principles of insurance management, prudent currency policy and patent laws. His most compelling curiosity, however, was in clinical epidemiology, initiated by the devastating influenza, scarlet fever and yellow fever epidemics which swept east coast cities between 1789 and 1795.

In the final decades of the 18th century, there had been no central depository through which medical information, even anecdotal gossip, might be collated, analyzed, and shared within the fraternity of physicians. Webster conceived of the novel notion of sending detailed questionnaires to those practitioners, domestic and foreign, confronting these deadly outbreaks. He asked them to provide clinical summaries of their cases and then to translate their daily clinical experiences into generalizations, even hypotheses, as too how they believed the infection spread and what factors either facilitated or hindered this spread. Webster selected physicians of opposing philosophies regarding these pestilences - some believing contagion to be the mechanism behind these flourishing epidemics; while others were believers in foul air [miasmatists] as the basis for the periodic outbreaks. Webster assembled these many letters into a landmark 1796 textbook, one of the first medical texts to be published in this nation.

Benjamin Rush, in Philadelphia, became deeply interested in Webster's writings and the two began an earnest correspondence which continued for decades. It was Rush who urged Webster to assemble his observations and thoughts into a monumental



two-volume text, "*Epidemic and Pestilential Diseases*," which appeared in 1799.

Webster defined contagion as "a quality of a disease, which, within a suitable distance, communicates it from a body affected with it, to a sound body, with great certainty, and under all circumstances of season, weather or situation." He pointed to small pox and measles as prime examples of contagions. Infection, on the other hand, he defined as: "That quality of a disease which may or may not excite it in a sound body. . . . and which depends on heat, foul air, an apt disposition in the receiving body, or other contingent circumstances, and which may excite the disease in the same person more than once." In a crude way, Webster was portraying the etiology of certain diseases as multifactorial. By inference, he also suggested that only true contagious diseases may confer immunity

upon the patient.

When confronted with evidence of a sequential chain of infections, Webster properly wondered from where the first case of this infection had been derived? Could a hostile environment, *by itself,* ultimately inaugurate an epidemic? He speculated that adverse ecological factors [crowding, accumulated filth, putrefying garbage, poverty, summer heat] might be sufficient cause[s] for infectious disease. Proximity to marshes and other loci of biological putrefaction, he contended, measurably increased the risk of contracting these fevers. The atmosphere, he concluded, could not be considered blameless in the causation of pestilential diseases. Accordingly, after much labor, he published a sweeping chronology of all epidemics recorded in medical writings from 1650 to 1799 and attempted to correlate these data with weather conditions, cometary appearances and even volcanic eruptions during this same interval. "There must be an alteration in the chemical properties of the atmosphere," he theorized, "to solve the difficulties that attend our inquiries into the cause of pestilence." He pleaded for sanitary measures "to diminish the mass of autumnal fevers."

Webster's intense curiosity regarding comets was motivated neither by mysticism nor astrologic belief. He was merely seeking out tangible factors which he might associate with epidemic disease. There was no structural error in his investigative thesis. Had he looked to the ignoble insects rather than the meteors and volcanoes, he might have uncovered more valid associations.

Missing in Webster's web of causality, of course, were such crucial elements as insect vectors [in yellow fever, typhus and malaria], asymptomatic human carriers [as in typhoid fever and meningitis], and animal reservoirs [as in bubonic plague]. It would require another century before these components could be factored into the complex equation of contagion, thus explaining the absence of person-to-person contact in certain communicable diseases.

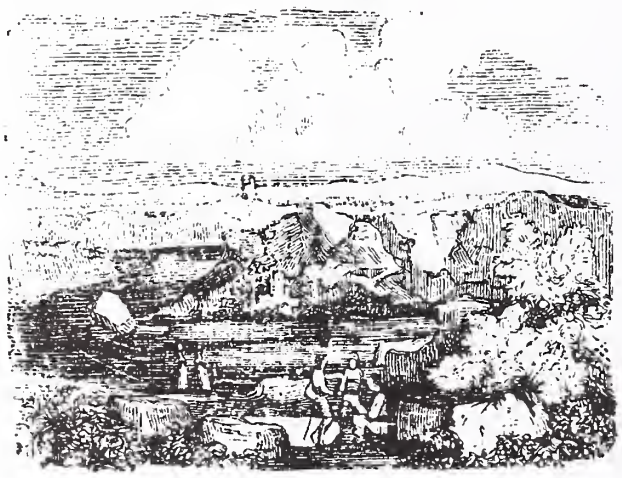
For the next 27 years Webster undertook yet another project. Single-handedly, he assembled a collection of some 12,000 words, organizing them into a dictionary of the American language, with spellings, pronunciations, and etymologies unique to the English-speaking nation on the west shore of the Atlantic. And in April of 1828, the monumental Webster's dictionary first appeared. This great lexicographer, teacher to a young republic, pamphleteer, demographer, amateur scientist, clinical epidemiologist and patriot died of pleurisy in the 85th year of his productive life.

Webster once commented: "The world is a book of instruction and he who will not profit by the lessons before him must be unfaithful to himself and his fellow citizens."

– Stanley M. Aronson, MD

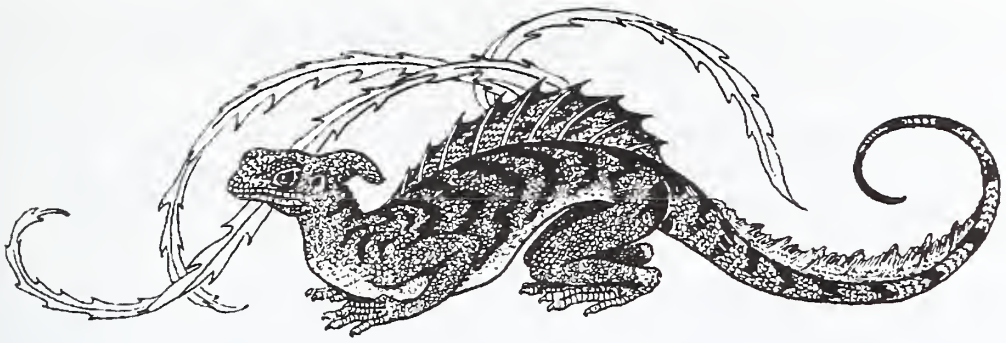
There Be Dragons Beyond the Hills

The serpent-dragon, embodiment of evil, has become more substantial than a mere metaphor but still less than a reality. As a symbol it has cropped up in the evocative art of primitive societies, in the elements of ancient religions and in the myths of modern nations. With all of the speculations on dragons, with all of the alleged sightings from Loch Ness to the Niebelungen caves, they must certainly exist; and if most of us have never encountered dragons, it must surely indicate the poverty of our experiences.



The parasitologist, however, never doubts the existence of dragons, especially little ones called *Dracuncula medinensis* [Greek, *dragos,* meaning serpent, with a diminutive suffix; the parasite was first described in Medina, Arabia.] This chronic parasitic infection is confined to certain states in poverty-stricken India, southwestern Asia and much of central and western sub-Saharan Africa. An estimated forty million humans are infected with a disorder which is rarely fatal but which nonetheless results in much pain, physical disability and economic burden upon those afflicted.

To flourish, the parasitic worm requires an impoverished, typically tropical region where either shallow wells or still ponds provide the sole source of water for both drinking and washing. The thread-like, mature female worm, ultimately some two feet in length, burrows its way to the muscles of the victim's trunk or legs. During this transit, the worm causes some fever, abdominal distress, weakness, much local itching and, where it finally emerges, an intensely painful skin blister. Rinsing the affected skin with available water is the natural response to the searing pain. But by doing so the blister bursts thereby disgorging millions of microscopic larvae from the mother worm into the well-water where they are ingested by microscopic crabs called Cyclops. And later when Cyclops-contaminated water is then consumed by thirsty humans, the dracuncula larvae are liberated in the victim's stomach; they then penetrate the small intestinal wall and migrate to the pelvic region where male and female dracuncula



worms mate, and the males then die. The gravid female, now elongating to immense size, migrates toward the exterior of the victim's body. After about a year of journey, the worm finally erodes through the skin to expel its multitude of larvae into the source of water used to cool the burning sensation it had crated. Thus the cycle begins anew.

Prevention of this debilitating infection is awesomely simple, particularly when confronting the problem in an air-conditioned medical school classroom. Filtering the infected drinking water through a piece of gauze will effectively remove the barely visible Cyclops crabs and thus prevent infection. Alternatively, adding certain chemicals, non-toxic to humans, to the well water will destroy the Cyclops crabs, thus removing the necessary intermediate vector; providing deeper wells which cannot be contaminated by the run-off of rinsed water; or, best of all, providing piped water to those communities which currently only dream of such a luxury. Any one of these measures will effectively interrupt the life cycle of infection and thus eliminate the disease. In certain selected Indian communities, the replacement of the open step wells with deep wells has proven to be an effective intervention.

The world wide eradication of dracunculosis [sometimes called Guinea worm infection] is now feasible. No one doubts that it can be totally eliminated with currently available, simple technologies reinforced by community education regarding the life cycles of the parasite. Yet, today, tens of millions suffer needlessly because the funds, the educational interventions, and the commitment is not yet there.

Dracuncula is a curious name for this ubiquitous parasite, chosen by a scientist from northern Europe where the mythology of dragons has deeper roots than elsewhere. Dragons have assumed a benevolent, protective role in China. In contrast, the northern Europeans, and those in Great Britain, perceive dragons as creatures of great evil, agents of Satan, destroyers of villages, consumers of defenseless maidens, and guardians, often, of great stores of treasure. Yet another function of the European dragon is to be engaged in deadly combat and ultimately be dispatched by some local hero.

The British actually have mixed feelings about dragons: Many an English village still preserves tales of ancient encounters with dragons while naming its hills, caves and pubs after some dimly remembered monster. Over six centuries ago, King Edward III adopted an obscure 4th century Christian martyr from Syria, St. George, and somehow merged his memory with the legend of Perseus. St. George, now portrayed as a slayer of dragons, was then raised to the patron-sainthood of England and his red cross incorporated into the Union Jack. The stubborn Welsh, on the other hand, sided with the dragon and triumphantly emblazoned the beast upon their national flag. The Americans, steering an independent course, have transformed the dragon to Disney dimensions giving it cuddly names such as Puff, Ollie or Barney. In the English-speaking world, then, the dragon may carry overtones of national pride, sounds of childlike innocence, or undertones of profound evil.

In truth, the "dragon" of dracunculosis is a poor and vulnerable creature. It has neither wings, talons nor scales. And yet to millions it causes greater anguish, physical impairment and economic loss than the combined onslaughts of all the fire-breathing dragons of ancient England. Most say that there are no dragons; and perhaps this is so. But if dracunculosis were truly conquered, would this not be a victory worthy of a St. George?

– Stanley M. Aronson, MD

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Levels of Physical Activity Among Rhode Island Adults

Jana E. Hesser, PhD, and Hyun Kim, PhD

Physical activity protects against a number of chronic diseases, in cluding coronary heart disease, hypertension, diabetes, osteoporosis, colon cancer, depression and anxiety.[1] In 1992 the American Heart Association put a sedentary life style on a par with high blood pressure, smoking, and high blood cholesterol as a modifiable risk factor for cardiovascular disease.[2] Regular physical activity has multiple health benefits and people who are physically active live longer, on average, than inactive people.[3]

Recent recommendations[4] are for all people age 2 and older to accumulate at least 30 minutes of endurance type physical activity, of at least moderate intensity, on most, preferably all, days of the week.

This paper presents recent data from Rhode Island's Behavioral Risk Factor Surveillance System (BRFSS) on the levels of physical activity among Rhode Island adults. Currently, there are no population based data on physical activity among children, and methods used to collect such data for high school students[5] are not comparable with those of the BRFSS. Consequently, all results presented here are only for adults ages 18 and older.

Methods

The BRFSS is an annual telephone survey of randomly selected residents age 18 and older who live in households with telephones.[6] It asks respondents questions about demographic characteristics and a variety of health behaviors, including ones related to physical activity. The BRFSS is used by the Centers for Disease Control and Prevention (CDC) in conjunction with state health departments to measure prevalence and time trends for health-related behaviors in individual states and in the U.S. as a whole. It is currently funded by CDC in 50 states and 4 territories.

The BRFSS has been conducted in Rhode Island each year since 1984. Each month the BRFSS conducts telephone interviews with approximately 150 randomly selected Rhode Island adults (approximately 1800 interviews each year). BRFSS methods are defined by CDC[7] and followed by all participating states. Physical activity questions have been asked each year on the BRFSS up through 1992. Subsequently, they have been asked only in even-numbered years. Weights are applied to BRFSS data so that results can be generalized to Rhode Island's entire adult population.

In the BRFSS information is collected only on leisure time physical activity; physical activity as part of regular job duties is excluded. Respondents are first asked whether they participated in any leisure time physical activities or exercise during the preceding month. Those who had participated are then asked about the two primary types of physical activity engaged in, how frequently these activities were undertaken, and for how long per session. The resulting data are then used to estimate the intensity and frequency of leisure time physical activity, and physical activity categories are derived from these estimates.[8]

In this report we present data for the years 1992 and 1994 combined (information on physical activity was not collected in 1993) for three mutually exclusive categories of physical activity: sedentary life-style ("sedentary"), regular and sustained physical activity ("sustained"), and moderate regular physical activity ("moderate"). All respondents were placed in one of these three categories, defined as follows:

Abbreviations Used:

BRFSS	Behavioral Risk Factor Surveillance System
CDC	Centers for Disease Control and Prevention

Regular and sustained physical activity:

Participation in physical activity 5 or more sessions per week, 30 minutes or more per session, regardless of intensity.

Moderate regular physical activity:

Participation in physical activity 3-4 times per week, 30 minutes or more per session, or 3 or more days per week, but 20-29 minutes per session, regardless of intensity.

Sedentary lifestyle:

Participation in no physical activity or participation in irregular physical activity (<3 times/week or <20 minutes per session). (While the category of "sedentary" includes persons who exercise irregularly, studies have shown that irregular physical activity is insufficient to have significant health impact.[9] Consequently, these persons are grouped together with those who participate in no physical activity.)

Percentage distributions were obtained for the three categories of physical activity (sedentary, moderate, and sustained) in relation to sociodemographic variables of age, gender, race/ethnicity, education, and income. The chi-square test was used to calculate the significance levels of 2 x n contingency tables for each physical activity category in relation to each sociodemographic variable. Multiple logistic regression was conducted to examine the independent effects of the

Table 1. Leisure-Time Physical Activity Status by Sociodemographic Characteristics, Rhode Island Adults, 1992 & 1994[1]

Demographic Characteristics	No. of respon-dents	Regular and Sustained Physical Activity[2]	Moderate Regular Physical Activity[3]	Sedentary Lifestyle[4]
All		21.8%	26.4%	51.8%
Age		*p*=.349[5]	*p*=.001	*p*=.001
18-24	355	27.0	32.4	40.6
25-44	1631	20.5	29.5	50.0
45-64	927	21.5	23.4	55.1
65-74	434	21.7	23.1	55.3
75+	320	19.8	11.6	68.6
Gender		*p*=.009	*p* =.586	*p* =.009
Male	1608	24.6	26.4	49.0
Female	2066	19.3	26.5	54.3
Race/ethnicity[6]		*p* =.725	*p* =.001	*p* =.015
White, Non-Hispanic	3297	21.6	27.2	51.2
Black, Non-Hispanic	125	22.7	16.5	60.8
Hispanic	161	21.8	17.8	60.4
Education		*p* =.027	*p* =.001	*p* =.001
Less than HS	614	18.7	16.7	64.6
HS Grad	1247	20.4	23.8	55.8
Some College /Post Grad	819	25.1	27.1	47.8
College Grad/Post Grad	986	22.7	36.1	41.2
Income		*p* =.185	*p* =.001	*p* =.001
<$20,000	1060	20.3	22.4	57.3
$20,000 - $50,000	1379	22.6	26.7	50.7
>$50,000	671	24.5	35.2	40.3

1. Percentages are calculated from weighted numbers.
2. 30+ minutes/session, 5+ times/week, regardless of intensity.
3. 30+ minutes/session, 3-4 times/week or 20-29 minutes/session, 3+ times/week, regardless of intensity.
4. No leisure time physical activity or physical activities less than 20 minutes/session, and/or less than 3 times/week during the past month.
5. *p* was calculated by Chi-square statistic with unweighted numbers. A *p* value less than .05 is considered to be significant.
6. Excludes persons of other races because numbers were too small to provide meaningful results.

above sociodemographic variables on the three categories of physical activity. Descriptive and chi-square statistics and multiple logistic regression analyses were conducted using the SAS software.

Results

From 1990 to 1994 the percentage of adults classified as sedentary in Rhode Island was lower than the United States median in each year. However, somewhat more than 50% of Rhode Island adults were classified as sedentary in each year.[10] In the 1992 and 1994 combined data, 22% of Rhode Island adults were classified as sustained exercisers, 26% were classified as moderate exercisers, and 52% were classified as sedentary. Of those who are sedentary, one-half (or 26% of all respondents) reported participating in no leisure time physical activity in the month preceding the survey while the other half exercised irregularly.

Table 1 compares the sociodemographic characteristics of the sample across physical activity categories. The prevalence of "sedentary" increases consistently as age increases, ranging from 40.6% for those ages 18-24 to 68.6% for those age 75 and over (Figure 1). The converse relationship is observed for moderate physical activity. The youngest age group has the

Table 2. Logistic Regression: The Effects of Sociodemographic Characteristics on Leisure-Time Physical Activity Status, Rhode Island Adults, 1992 & 1994.

Demographic Characteristics	Regular & Sustained Physical Activity[1]	Moderate Regular Physical Activity[2]	Sedentary Lifestyle[3]
	Odds Ratio	Odds Ratio	Odds Ratio
Age			
25-44 vs 18-24	0.68**	0.94	1.38*
45-64 vs 18-24	0.77	0.65**	1.71***
65-74 vs 18-24	0.85	0.83	1.32
75+ vs 18-24	0.68	0.50**	2.14***
Gender			
Female vs Male	0.80**	1.06	1.12
Race/ethnicity[4]			
Black, NH vs White, NH	1.3	0.53*	1.25
Hispanic vs White, NH	1.1	0.55*	1.40
Education			
Less than HS vs Coll Grad/Post Grad	0.80	0.47***	2.08***
HS Grad vs Coll Grad/Post Grad	0.87	0.60***	1.70***
Some College vs Coll Grad/Post Grad	1.01	0.68***	1.39**
Income			
<$20,000 vs >$50,000	0.87	0.69**	1.48**
$20,000 - $50,000 vs >$50,000	0.99	0.81*	1.22

*p <=.05
**p <=.01
***p <=.001

1.30+ minutes/session, 5+ times/week, regardless of intensity.
2. 30+ minutes/session, 3-4 times/week or 20-29 minutes/session, 3+ times/week, regardless of intensity.
3. No leisure time physical activity or physical activities less than 20 minutes/session, and/or less than 3 times/week during the past month.
4. Excludes persons of other races because numbers were too small to provide meaningful results.

highest rate for "moderate" (32.4%) while the rate for those 75 and older is lowest (11.6%). The largest rate change for both "moderate" and "sedentary" occurs at age 75 and older. While the rate for "sustained" is highest (27%) among those age 18-24, it varies little among those 25 and older.

The prevalence of "sedentary" is significantly greater among females than males (54.3% vs 49%) while males have a higher rate for "sustained" (24.6% vs 19.3%). There is no difference between males and females for "moderate." There is a striking difference in the pattern of physical activity between males and females by age group (Figure 2). Among those 18-24, males have a lower rate than females for "sedentary" (34.9% vs 46.5%), and a higher rate for "sustained" (35.2% vs 18.6%). After age 25, levels of physical activity for males and females are more similar to one another, up to age 75. At this age, "sedentary" increases in both groups substantially and "moderate" decreases but these changes are much more dramatic for females. Seventy-three percent of females over the age of 75 are classified as "sedentary" compared with 61% of males.

Blacks and Hispanics have higher rates for "sedentary" (about 60% in both groups) than non-Hispanic whites (51%). This difference can be accounted for by differences in participation in moderate physical activity between non-Hispanic whites (27.2%), blacks (16.5%), and Hispanics (17.8%). The proportion participating in sustained activity is almost identical in the three groups.

The rates for "sedentary" decrease, while those for "moderate" increase, with increasing socioeconomic level as measured by both income and education (Figures 3 and 4). A higher education level is also associated

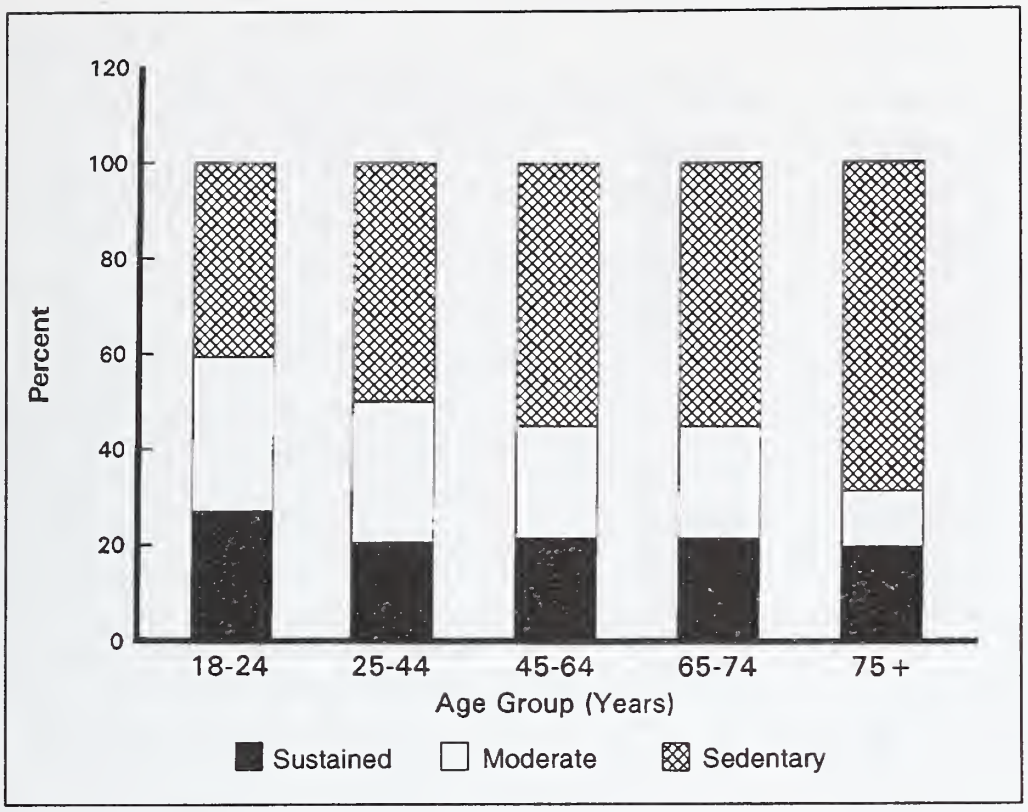

Figure 1. Physical Activity Levels Among Rhode Island Adults, by Age, 1992 and 1994.

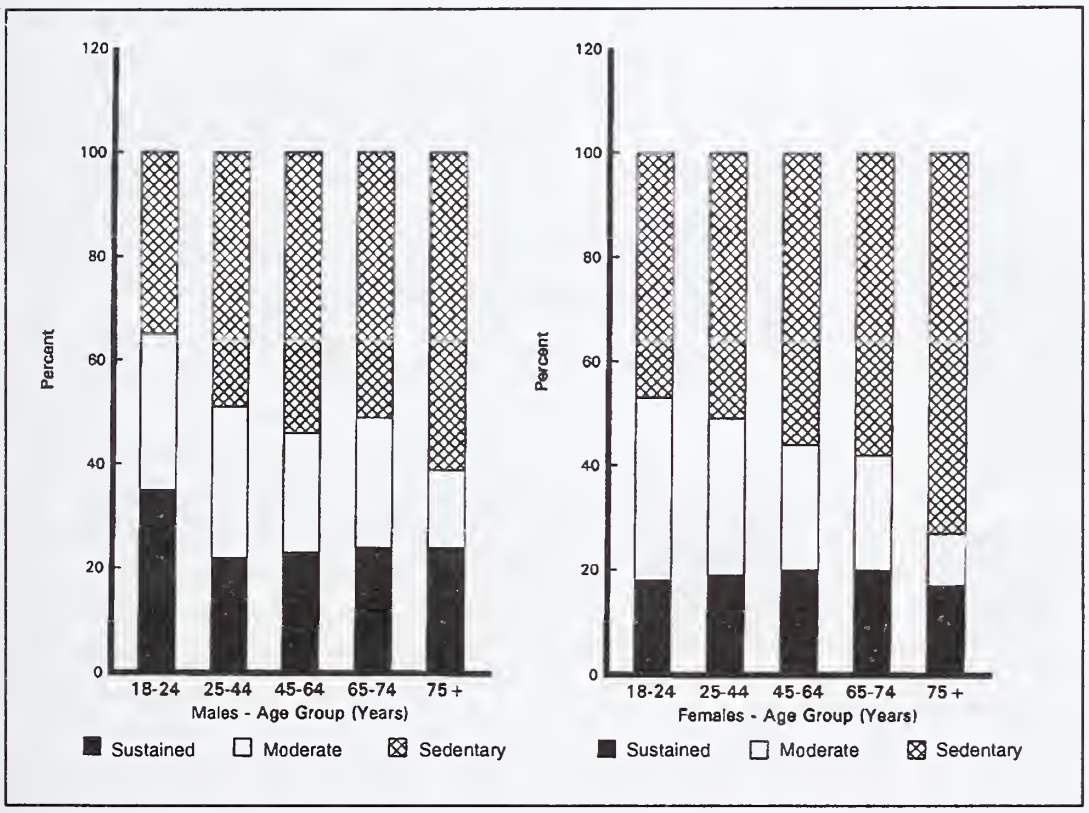

Figure 2. Physical Activity Levels Among Rhode Island Adults, by Age and Gender, 1992 and 1994.

significantly with a higher rate for sustained physical activity.

Table 2 reports the odds ratios obtained from a multiple logistic regression model. This model assesses the extent to which each of the selected sociodemographic characteristics (independent variables) is associated with categories of physical activity (dependent variables), while controlling for the effects of the others. The model employs the dependent binary variables sedentary/not sedentary, sustained/not sustained, and moderate/not moderate. Age 18-24, white non-Hispanic, male, annual household income greater than $50,000 or greater, and college graduate/post graduate, are the reference groups for the independent variables of age, race, sex, income, and education respectively. They were selected as reference groups because they have the lowest rates for sedentary. The estimated odds ratios show to what extent each sociodemographic group is different from its reference group for each category of physical activity.

The results of the regression generally confirm observations mentioned above but provide interesting additional information. For those 75 and older, the odds of being sedentary are twice those of the 18-24 year old reference group. The odds of participation in moderate activity are much lower in those 45-64 than in those ages 18-24. The odds of participation in sustained activity are lowest for persons 25 - 44 years old when compared with 18-24 year olds. Being female significantly decreases the odds of participation in sustained activity compared with males, but does not relate to moderate or sedentary activity levels when other variables are controlled. Being black or Hispanic decreases the chances of participation in moderate physical activity by almost half, compared with non-Hispanic whites, but does not significantly increase the risk of sedentary or affect the odds of participation in sustained activity when age, gender, income, and education are controlled. Lower socioeconomic status, as measured by level of education and annual household income, significantly increases the risk of being sedentary, and decreases the odds of participating in moderate activity. These odds are most extreme for the lowest income group and the lowest education group. However, variations in education and income are not associated with participation in sustained activity when other variables are controlled.

Discussion

This analysis provides some new insights into levels of physical activity among adults in Rhode Island and can help to identify appropriate intervention strategies and key target groups. Age, race/ethnicity, education and income are significantly associated with moderate physical activity, and age, education, and income are significantly associated with

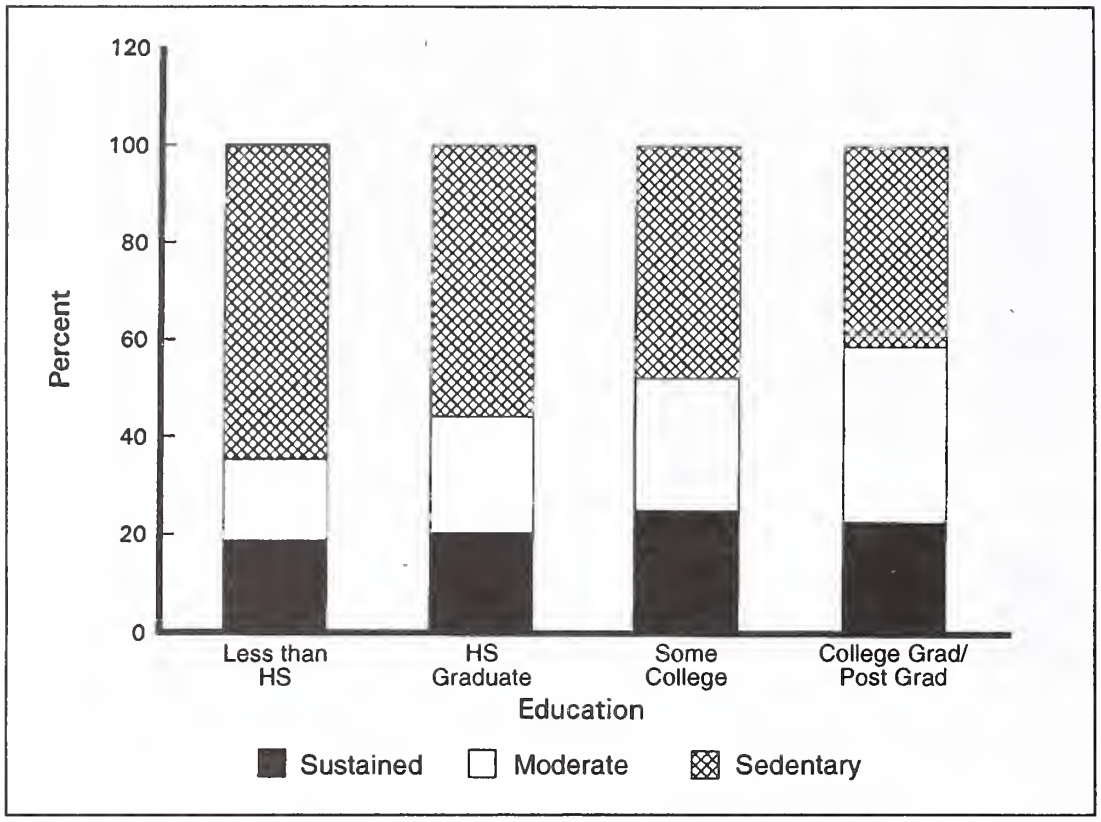

Figure 3. Physical Activity Levels Among Rhode Island Adults, by Education, 1992 and 1994.

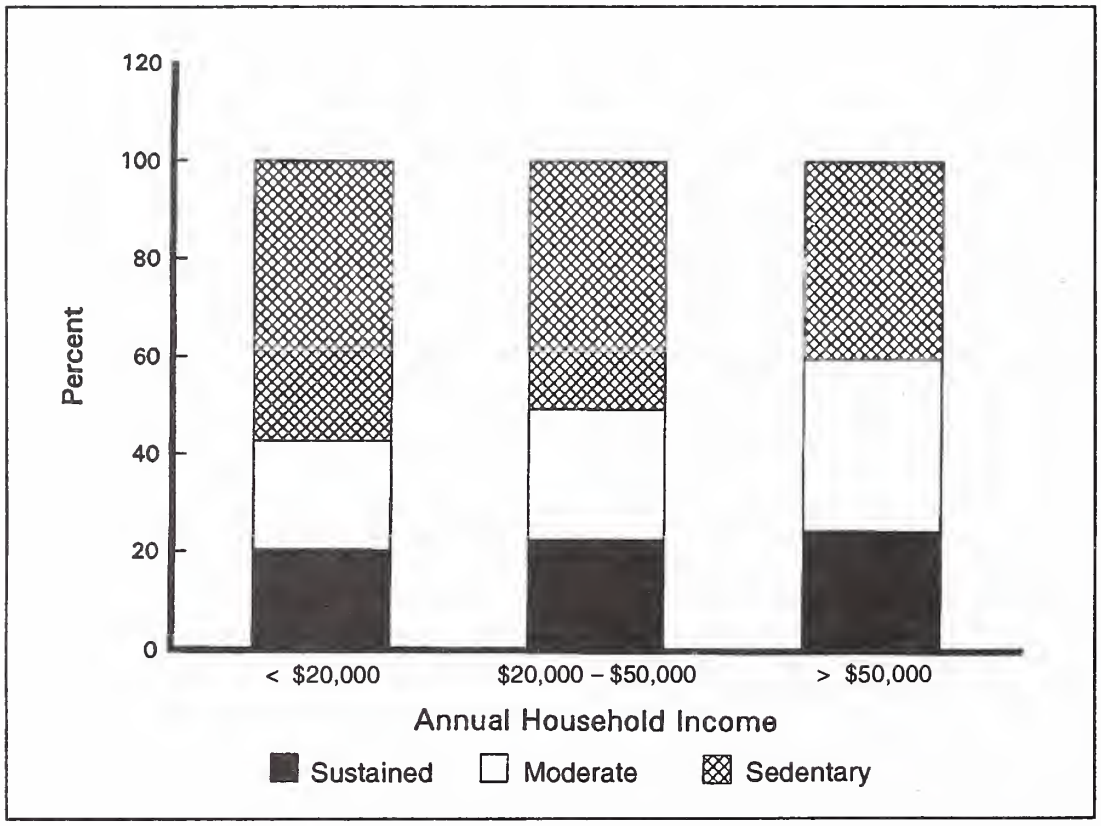

Figure 4. Physical Activity Levels Among Rhode Island Adults, by Income, 1992 and 1994.

being sedentary. Being over age 45, having an annual income of less than $50,000, having less than a college education, or being black or Hispanic, significantly decreases the odds of participation in moderate physical activity; and these effects are independent of one another. Being over 45, having less than a college education, or having an annual income of less than $20,000, significantly increases the likelihood of being sedentary. Moderate and sedentary physical activity categories co-vary—as rates for "moderate" go down, rates for "sedentary" go up. It appears that these two groups "interact" with one another, in that there is transition between these groups with changing circumstances, while the "sustained" group appears to remain separate.

The most surprising result of this analysis is the finding that participation in sustained physical activity is not significantly affected by the variables of race/ethnicity, education, or income. The effect of age and gender on sustained activity appears to be due primarily to the much higher levels of sustained among males ages 18-24. Otherwise, a consistent proportion of persons in nearly all demographic categories report participation in sustained physical activity. Further study is needed to characterize this population of regular, sustained exercisers, and to identify what differentiates them from moderate exercisers, and from those who are sedentary. Understanding this group of Rhode Islanders may provide important clues for improving program interventions whose aim is to turn moderate exercisers into sustained exercisers.

A second finding of interest for intervention programs is the apparent flux of persons between moderate physical activity and sedentary lifestyles. Although the BRFSS does not provide information on longitudinal exercise patterns, it appears that persons who exercise moderately are at relatively high risk of becoming sedentary. It would be helpful to understand what events are likely to result in reduction of physical activity from moderate levels, and how to prevent such reduction. It would also be helpful to better understand the transition from sedentary status to that of moderate and/or sustained regular physical activity. These appear to be key points for designing effective intervention programs that will increase Rhode Islander's participation in physical activity.

References

1. U.S. Department of Health and Human Services, Public Health Service. *Healthy People 2000 Review: 1995-1996.* Hyattsville, MD: National Center for Health Statistics, 1996.
2. *Heart and Stroke Facts.* Dallas, TX: American Heart Association, 1992.
3. U.S. Department of Health and Human Services, Public Health Service. *Physical Activity and Health. A Report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
4. U.S. Department of Health and Human Services, Public Health Service. *Physical Activity and Health. A Report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
5. Youth Risk Behavior Surveillance — United States, 1995. *MMWR* Vol 45/No. SS-4, September 27, 1996.
6. U.S. Department of Health and Human Services, Public Health Service. *Health Risks in America: Gaining Insight From the Behavior Risk Factor Surveillance System.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, (no date provided).
7. Frazier EL. Franks AL, Sanderson LM "Behavioral Risk Factor Data" In: *Using Chronic Disease Data: A Handbook for Public Health Practitioners.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1992.
8. Casparsen CJ. "Description of the scoring system for the physical activity questions of the Behavioral Risk Factor Surveillance System." Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1985.
9. U.S. Department of Health and Human Services, Public Health Service. *Physical Activity and Health. A Report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
10. Casey DB, Hesser JE, Beuchner, JS. *Health Risk Behaviors Among Rhode Island Adults 1990-1994.* Providence, RI: Rhode Island Department of Health, 1996.

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The Benefits of Physical Activity

Our patients should be active. For almost everyone (even those with pre-existing health problems), physical activity provides primary and secondary prevention benefits for a wide range of chronic diseases and other specific medical problems. The longest recognized is the well-documented dose-response relationship between physical fitness and cardiovascular disease, but there are also direct and indirect preventive benefits for diabetes and cancer. Chronic disease risk factors such as bone density and overweight are also ameliorated through regular physical activity. Finally, exercise is associated with improved psychological well being, including improved mood and self-esteem, reduced anxiety, and the prevention or reduction of depression.

The Cardiovascular Benefits of Regular Participation in Physical Activity

Carol Ewing Garber, PhD, FACSM

Physical activity is beneficial for cardiovascular health. Many studies have demonstrated an inverse, dose-response relationship between physical activity or physical fitness and cardiovascular disease (CVD) mortality; these effects persist after adjustment for age, CVD risk factors, and other potential confounders.[1-6] Although limited data are available, women and men appear to derive similar benefits from being physically active.[1,6]

Physical activity is also inversely related to the incidence of myocardial infarction,[3-5] stroke,[7] peripheral vascular disease,[8] hypertension,[9] and non-insulin dependent diabetes.[10] In addition, plasma fibrinogen levels, blood triglyceride levels, blood low-density lipoprotein levels, body mass index or body weight, and smoking relate inversely and blood high-density lipoprotein levels relate directly to physical activity.[11]

There are few patients who will not benefit from a program of regular physical activity.

Numerous physiologic adaptations result from regular physical exertion.[11] Cardiovascular changes following physical training include improvement in maximal oxygen uptake, cardiac output, oxygen extraction, and vascular transport capacity.[11] Alterations in hormonal, metabolic, and hemostatic factors impact several CVD risk factors. Controlled trials of exercise training have resulted in reductions in the levels of total cholesterol, triglycerides, low-density lipoprotein cholesterol, systolic and diastolic blood pressure, adiposity and blood coagulation factors, as well as in increased levels of high-density lipoprotein cholesterol, fibrinolytic factors and hormonal sensitivity.[11-13]

Abbreviations Used:

CVD Cardiovascular disease

Based on the evidence obtained through decades of clinical trials, the association between physical activity and CVD mortality is probably causal:

- evidence of this association is consistent across studies, which suggests the absence of selection bias;
- risk level for CVD morbidity and mortality is sensitive to changes in physical activity;
- physical activity temporally precedes physiologic alterations and the reduction of CVD morbidity and mortality;
- evidence shows a dose-response relationship;[2]
- the association between physical activity and CVD morbidity and mortality persists following adjustment for potential confounders; and
- the many biological changes consequent to exercise training support the biological plausibility of the effects of physical activity on CVD mortality — some, such as the decrease in blood lipid levels, are on the causal path themselves.[1]

Physical activity is recommended for primary and secondary prevention of cardiovascular and other diseases in a wide variety of patients.[14-16] There are few patients who will not benefit from a program of regular physical activity.

References

1. Lee I-M, Paffenberger RS. Do physical activity and physical fitness avert premature mortality? *Exerc Sports Sci Rev* 1996;24:135-171.
2. Pate R. Physical activity and health: dose-response issues. *Res Q Exerc Sport* 1995;66:313-317.
3. Berlin JA, Colditz GA. A meta-analysis of physical activity in the prevention of coronary heart disease. *Am J Epidemiol* 1990;132:612-628.
4. Blair SN, Krampert JB, Kohl HW, et al. Influences of cardiorespiratory fitness and other precursors on cardiovascular disease and all-cause mortality. *JAMA* 1996;276:205-210.
5. Paffenbarger RS, Krampert JB, Lee I-M, et al. Changes in physical activity and other lifestyle patterns influencing longevity. *Med Sci Sports Exerc* 1994;26:857-865.
6. Blair SN, Kohl HW, Barlow CE, et al. Physical fitness and all-cause mortality: A prospective study of healthy men and women. *JAMA* 1989;262:2395-2398.
7. Gillum RF, Mussolino ME, Ingram DD. Physical activity and stroke incidence in women and men. *Am J Epidemiol* 1996;143:860-869.
8. Housley E, Leng GC, Donnan PT, Fowkes FG. Physical activity and risk of peripheral artery disease in the general population: Edinburgh artery study. *J Epidemiol Community Health* 1993;47:475-480.
9. Blair SN, Goodyear NN, Gibbons LW, Cooper KH. Physical fitness and incidence of hypertension in healthy normotensive men and women. *JAMA* 1984;252:487-490.
10. Burchfiel CM, Sharp DS, Curb JD, et al. Physical activity and incidence of diabetes: the Honolulu Heart Program. *Am J Epidemiol* 1995;141:360-368.
11. Bouchard C, Despres J-P. Physical activity and health: atherosclerotic, metabolic and hypertensive diseases. *Res Q Exerc Sport* 1995;66:268-275.
12. Durstine JL, Haskell WL. Effects of exercise training on plasma lipids and lipoproteins. *Exerc Sports Sci Rev* 1994;22:477-521.
13. Stefanick ML. Exercise and weight control. *Exerc Sports Sci Rev* 1993;21:363-436.
14. Smith SC, Blair SN, Criqui MH, et al. Preventing heart attack and death in patients with coronary disease. *Circulation* 1995;82:2-4.
15. Centers for Disease Control and Prevention. Public health focus: Physical activity and the prevention of coronary heart disease. *MMWR* 1993;A42:669-672.
16. McHenry PI, Ellestad MH, Fletcher GF, et al. Statement on exercise: A position statement for health professionals by the committee on exercise and cardiac rehabilitation of the council on clinical cardiology, American Heart Association. *Circulation* 1990;81:396-398.

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Diabetes and Exercise

Preston Lamberton, MD, and David Steigman, MD

Although exercise is a beneficial form of treatment for patients with diabetes mellitus, it appears that health care providers often give less emphasis to exercise than to other treatment modalities. In addition, studies of patients with diabetes have demonstrated that as a group, they are less than fully compliant with a prescribed exercise plan, as are non-diabetic patients. Thus, for a number of reasons, exercise has not achieved the benefits that could be expected in the treatment of diabetes.

Numerous studies have shown that exercise can improve insulin resistance, thereby improving glucose control in patients with Type II diabetes. The mechanism of this improvement appears to result from changes in certain proteins that transport glucose into muscle cells (Glut 4 proteins). Exercise has been shown to increase the number of Glut 4 transport proteins, thereby improving the delivery of glucose into muscle cells. This improvement can be substantial and may allow Type II diabetic patients to reduce or eliminate their need for oral medications or insulin. Similarly, studies such as the Honolulu Heart Program have shown that exercise may prevent the development of Type II diabetes, likely through similar mechanisms.

Although improved diabetic control is often seen with exercise in patients with Type II diabetes, so far studies have not demonstrated a clear benefit to glucose control in patients with Type I diabetes. However, exercise still has numerous beneficial effects for patients with Type I and Type II diabetes, including reduction in cardiovascular risk factors and improved sense of well-being. In diabetic patients with abnormal lipid profiles, exercise may lower total cholesterol, LDL cholesterol, and triglyceride levels, and may raise HDL cholesterol levels.. In addition, exercise can lower elevated blood pressure levels and reduce weight in obese patients with Type I or Type II diabetes.

There are certain risks associated with exercise that need to be addressed prior to prescribing an exercise program. Patients with diabetes are at risk of having silent cardiac ischemia; therefore an exercise stress test should be done prior to beginning exercise in patients over age 35. In addition, exercise can cause retinal hemorrhages in patients with advanced retinopathy or

may cause foot injuries (e.g. ulcerations) in patients with peripheral neuropathy and/or vascular insufficiency. It is important therefore that health care providers assess the presence and severity of vascular and neurological complications before prescribing an exercise program for their patients.

The amount of exercise necessary to benefit patients with diabetes has been defined in a recent position statement by the American Diabetes Association (ADA). It is suggested that such an exercise program include: 1) aerobic exercise at 50-70% of an individual's maximum O_2 uptake, 2) last 20-45 minutes and be done at least three times per week, 3) include low intensity warm-up and cool-down exercises, and 4) be tailored to the patient's general physical condition and lifestyle (see references). The ADA statement emphasizes the need for patients to wear proper foot wear, avoid exercising in extremes of temperature, inspect feet before and after exercise and avoid exercise during periods of poor glucose control. In short, a modest amount of exercise is beneficial, while high intensity, prolonged exercise is not necessary for patients with diabetes to achieve significant benefits.

The level of glucose control at the time of exercise needs to be assessed prior to exercising, particularly for those on insulin therapy. Exercise may significantly lower glucoses during and after exercise, occasionally for as long as 24 hours after completion of the exercise. As a result, patients taking insulin may need to decrease the quantity of insulin taken before or after exercise to prevent the development of exercise-induced hypoglycemia. In general, patients taking insulin should check their capillary glucose levels 60 and 30 minutes before exercising to determine if their glucose levels are stable or are falling. It is generally helpful for such patients to try to avoid exercising at times of insulin peaks and to schedule exercise several hours after a meal. In addition, patients with Type I diabetes in particular are at risk of developing worsened glucose control and potential Diabetic Ketoacidosis (DKA) if they exercise at a time of uncontrolled hyperglycemia. It has been recommended that patients with Type I diabetes avoid exercise when their glucoses are over 300 mg/% or when they have moderate or high levels of urinary ketones. The "stress" of exercise in this setting could worsen already uncontrolled diabetes and lead to an acute metabolic decompensation. Such patients should wait until after their glucoses are better controlled, typically following additional insulin therapy.

Because exercise, when prescribed following an appropriate vascular and neurological screen, can potentially benefit patients with Type I or Type II diabetes, health care providers clearly have an important role in counseling these patients to become physically active. It is evident however, that physicians, both generalists and subspecialists, do not do this nearly enough. The reasons given include lack of time, lack of reimbursement, lack of training in behavioral counseling, lack of support staff, and lack of clear and standardized recommendations. The latter is no longer valid given the recent publication of several useful guidelines, including those discussed above that are specific to diabetes. However, simply telling patients to be more physically active, or to exercise, is not likely to be very effective. Instead, physicians can use tools such as Project PACE (Physician based Assessment and Counseling for Exercise), a program designed to overcome the barriers of time, skill and knowledge. It allows health care providers to systematically use behavioral counseling methods such as goal setting, barrier and solution identification, and social support network development. In the insert of this issue, an "exercise prescription" is included on one side of a two-sided educational sheet. The "exercise prescription" represents a condensation of the PACE approach, combining several forms and steps into one sheet to be used during a three to five minute session with the patient. Developed by David Steigman, this can be a useful tool in counseling all patients about physical activity, regardless of diabetes status. In addition, references are included for further information on exercise prescription for patients with diabetes.[1-9] Using these and other tools, physicians can assist their patients in using exercise to help control their diabetes.

References:

1. American Diabetes Association. Clinical Practice Recommendations 1997. *Diabetes Care.* 1997;20:S1-70.
2. Wasserman DH, Zinman B. Exercise in Individuals with IDDM. *Diabetes Care.* 1994;17:924-937.
3. Schneider SH. Exercise and NIDDM. *Diabetes Care.* 1990;13:785-789.
4. Burchfiel CM, Sharp DS, Curb JD, et al. Physical Activity and Incidence of Diabetes: The Honolulu Heart Program. *Am J Epidemiol.* 1995;141:360-368.
5. Young JC. Exercise Prescription for Individuals with Metabolic Disorders: Practical Considerations. *Sports Med.* 1995;19:43-54.
6. Lewis CE, Clancy C, Leake B, Schwartz JS. The counseling practices of internists. *Ann Intern Med.* 1991;114:54-58.
7. Long BJ, Calfas KJ, Wooten W, et al. A multi-site field test of the acceptability of physical activity counseling: Project PACE. *Am J Prev Med.* 1996;12:73-81.
8. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA.* 1995;273:402-407.
9. Patrick K, Sallis J, Long B, et al. A New Tool for Encouraging Activity: Project PACE. *The Physician and Sports Medicine.* 1994;22(11):45-55.

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The Benefits of Physical Activity in Regard to Cancer

Michael P. Vezeridis, MD, FACS

Physical activity can contribute to a reduction in the risk of developing some types of cancer, as shown in both experimental animal studies and epidemiologic studies.[1] The mechanisms can vary. Physical activity may act indirectly to reduce cancer risk by preventing obesity through balancing caloric intake with energy expenditure. Obesity is associated with an increased risk in the development of cancers in the breast, endometrium, kidney, prostate, colon and rectum,[2-7] while a reduction of cancer risk has been suggested among formerly overweight people who have lost weight.[8] Physical activity may also help indirectly to protect against certain cancers, including colon cancer, breast cancer, and stomach cancer, by enabling active people to consume larger amounts of healthy foods such as fruits, vegetables and grains while still maintaining a healthy body weight.[1]

Physical activity may have direct protective effects against some cancers as well, such as colon cancer. Numerous studies have demonstrated the relationship between current occupational and leisure-time physical activity and a decreased risk of colon cancer in both men and women;[9] no association was observed between physical activity during early adulthood and colon cancer risk later in life, however.[9,10] The observed protective effect of physical activity against the development of colon cancer may be attributed to the fact that physical activity stimulates movement of the bowel. This results in faster movement of the bowel contents, which decreases the amount of time that the bowel lining is exposed to carcinogenic substances.[1] Also, physical activity suppresses the production of hormone-like chemicals that increase the rate of colon cell proliferation, which may decrease the likelihood of tumor growth.[9]

Physical activity may also produce a protective effect through other mechanisms of action, although the data is inconsistent. For instance, physical activity may reduce the risk of prostate cancer in men, and breast and other hormone-dependent cancers in women by altering hormone levels in the bloodstream.[11,12] This suggestion is supported by some evidence that physical activity in adolescence and young adulthood may protect against the development of breast cancer later in life, as well as the observation that physically active women demonstrate a decreased risk of developing these types of cancers when compared to their non-active peers.[9]

Numerous studies have demonstrated the relationship between current occupational and leisure-time physical activity and a decreased risk of colon cancer ...

Relationships between regular, moderate physical activity and a reduced risk of development of other cancers have been suggested for many types of cancer, with varying levels of support for these relationships demonstrated in the literature. While the results range from conclusive support for a positive impact on the risk of developing colon cancer as discussed above to no evidence of a relationship with rectal cancer, the impact of physical activity on the development of most types of cancer falls somewhere in the middle. However, the data have consistently shown that physical activity will not increase the risk of developing cancer; when combined with the potential health benefits that physical activity can offer in terms of other chronic disease prevention, this evidence confirms the value of leading an active life. Moderate physical activity for 30 minutes daily is a reasonable recommendation for general health promotion[9,13,14] that may also contribute to a reduction in the risk of developing many types of cancer.

References

1. The American Cancer Society 1996 Advisory Committee on Diet, Nutrition and Cancer Prevention. Guidelines on Diet, Nutrition and Cancer Prevention: Reducing the Risk of Cancer with Healthy Food Choices and Physical Activity. *Ca Cancer J Clin* 1996;46:325-341.
2. Albanes D. Energy balance, body size, and cancer. *Crit Rev Oncol Hematol* 1990;19:283-303.
3. Hunter DJ, Willett WC. Nutrition and breast cancer. *Cancer Causes Control* 1996;7:56-68.
4. Hill HA, Austin H. Nutrition and endometrial cancer. *Cancer Causes Control* 1996;7:19-32.
5. Wolk A, Lindblad P, Adami H-O. Nutrition and renal cell cancer. *Cancer Causes Control* 1996;7:5-18.
6. Kolonel LN. Nutrition and prostate cancer. *Cancer Causes Control* 1996;7:83-94.
7. Potter JD. Nutrition and colorectal cancer. *Cancer Causes Control* 1996;7:127-146.
8. Williamson DF, Pamuk E, Thun M, et al. Prospective study of intentional weight loss and mortality in never-smoking overweight U.S. white women aged 40-64 years. *Am J Epidemiol* 1995;151:1128-1141.
9. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.

10. Marcus PM, Newcomb PA, Storer BE. Early adulthood physical activity and colon cancer risk among Wisconsin women. *Cancer Epidemiology, Biomarkers and Prevention* 1994;3:641-644.
11. Shephard RJ. Exercise in the prevention and treatment of cancer: An update. *Sports Med* 1993;15:258-280.
12. Friedenreich CM, Rohan TE. A review of physical activity and breast cancer. *Epidemiology* 1995;6:311-317.
13. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273:402-407.
14. NIH Consensus Development Panel on Physical Activity and Cardiovascular Health. Physical activity and cardiovascular health. *JAMA* 1996;276:241-246.

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Exercise and the Skeleton

Joseph R. Tucci, MD, FACP, FACE

Osteoporosis, a world-wide problem affecting women much more frequently than men, is characterized by a low bone mass and vulnerability to nontraumatic or fragility fractures. Up to 25 million Americans and a third of all postmenopausal women in the United States have osteoporosis. It is associated with considerable morbidity and mortality as a result of 1.5 million vertebral, hip, forearm and other fractures each year.[1] Short-term care for hip fractures costs more than ten billion dollars yearly—a figure expected to rise to 60 billion dollars by the year 2020.

The most important determinant of skeletal development and peak bone mass is genetics, but other factors can modulate the ultimate attainment of peak bone mass. Some of the more important factors include nutrition, particularly dietary calcium intake, body mass, hormonal status and physical activity, the latter primarily that which involves weight-bearing. Peak bone mass is attained by the age of 20 to 30 years. Beginning in the fourth decade, bone loss begins in women at a rate of up to 0.3% per year, somewhat greater than the rate in males. During the first several peri/postmenopausal years the rate of bone loss accelerates to as much as 3% per year. Subsequently, there is a decrease in the rate of bone loss to less than 1% per year.[2]

Physical activity has much to do with the constant turnover or remodeling of bone which occurs throughout life. Bone formation is related to osteoblastic activity while bone resorption is related to osteoclastic activity. Physical activity is a critical determinant of bone formation through stimulation of osteoblastic activity whereas inactivity results in decreased osteoblastic activity and increased osteoclastic activity with resultant loss of bone. The mechanisms by which physical activity renders its effect on bone have not been elucidated. Force applied to bone is defined as stress and the resulting deformation in bone is defined as strain. The effect of physical activity on bone may be mediated by a sequence of events including a physical alteration or deformation of bone, electrical and biochemical changes, and ultimately alterations in the activity of osteoclasts and osteoblasts.[3] Weight bearing may be the most important exogenous factor affecting bone remodeling. In 1683, Galileo noted a direct correlation between body weight and bone size. Two hundred years later, Julius Wolff noted that changes in bone mass accompany changes in load through skeletal remodeling. Wolff explained, "every change in the function of bone is followed by certain definite changes in internal architecture and external conformation in accordance with mathematical laws."[4] Simply stated, this law of Wolff describes how form follows function. In animal studies, mechanical loading is associated with increased bone mass; immobilization, with decreased mass.

Clinically, physical activity is felt to be an important determinant of skeletal integrity, and exercise is routinely recommended for the prevention and treatment of osteoporosis. Supporting data include the considerable bone loss which occurs with paralysis or immobilization in clinical and experimental studies and during space travel with loss of gravitational forces. Immobilized patients may lose up to 1% per

week and up to 40% of their skeletal mass in less than twelve months while weight bearing activity each day for 30 minutes may prevent such loss.[5] This impression is also based on the increases in bone mass seen in athletes or those involved in an ongoing exercise program. Athletes have been reported to have 10 to 40% greater bone mass than sedentary individuals. The greatest increases in bone mass are seen with strength training regimens. However, could it be that those with greater bone mass are more likely to be athletes? Also, are athletes more likely to have included exercise programs early in life when one would expect a greater impact on the skeleton? Tennis players have greater bone mass in their dominant or playing arms as compared with the nondominant or nonplaying arms. Muscle strength and muscle mass as well as life-long physical activity patterns have been correlated with skeletal mass.

Regular or habitual physical activity during the first 20 to 30 years of life will help to optimize or maximize skeletal development and peak bone mass. Continued activity later in life may help to maintain bone mass and thereby prevent or delay the onset of fragility-related fractures. Fewer hip fractures occur in women who are physically active as compared with those who are less active. However, data relating to the role of moderate physical activity on bone mass in adults, older subjects, or patients with osteoporosis are conflicting. Intervention trials in which exercise regimens have been introduced in young, middle-aged, and elderly subjects have resulted in increases, no change, or even decreases in bone mass.[5]

Generally positive and modest results on bone mass are seen when exercise is sustained and intensive or strenuous and bone mass is measured at sites subjected to the increase in physical loads. However, for a continued effect, physical activity needs to be maintained indefinitely because when the activity ceases, bone mass tends to decrease. In those cases where exercise is introduced later in life as part of a therapeutic regimen for patients who have osteoporosis with or without fractures, regular physical activity and exercise programs can result in greater muscle strength, muscle tone and greater flexibility and postural stability. However, since many of these patients may be at low levels of fitness, they may need cardiovascular assessment prior to institution of an exercise regimen. For most of these patients any weight-bearing activity such as walking would be appropriate. Exercise programs for the elderly should stress not only walking, but also back strengthening and stretching exercises, and postural awareness. The latter could be taught through one or at most several sessions with a physical therapist and then carried on by subjects on their own on a regular basis. Whole body bone density measurements were greater in healthy postmenopausal women who walked a mile daily as compared to measurements in those who walked less than a mile per week. Walking was also effective in slowing the rate of bone loss from the legs.[6-8]

Weight bearing may be the most important exogenous factor affecting bone remodeling.

On the other hand, intense physical activity can predispose athletes to osteoporosis and stress fractures.[9] This is an important clinical problem in female athletes who develop ovarian dysfunction and hypoestrogenism. Young female athletes such as runners and ballet dancers may exhibit delayed puberty or menarche and adult women may develop oligo-amenorrhea. Bone loss in such individuals is related to estrogen deficiency. In many of these athletes another factor may be poor nutrition. In contrast, competitive women gymnasts despite oligomenorrhea exhibit increased bone mass measurements. This finding may be attributed to the greater mechanical loads on the spine and hips. At any rate, such observations point to the important interaction of factors on the skeleton and the fact that physical activity will not compensate or overcome the deleterious effects of estrogen deficiency on bone mass.

Unfortunately, regular exercise is not part of most of our daily lives. The great mechanical and technological advances of the twentieth century have diminished the need for many physical activities that previously had been part of our daily activities. Data strongly suggest the role and need for regular moderate physical activities for development of optimal peak bone mass and for moderation of the inexorable loss of bone that occurs with aging.

References

1. Bachrach L. Bone acquisition in childhood and adolescence. In: Marcus R, ed. *Osteoporosis.* Cambridge, MA: Blackwell Scientific Publications;1994:69.
2. Bouxsein ML, Marcus R. Overview of exercise and bone mass. *Rheum Dis Clin NA* 1994;20:787-802.
3. Drinkwater BL. Physical activity, fitness and osteoporosis. In: Bouchard C, Shephard RJ, Stephens T, eds. *Physical Activity, Fitness and Health.* Champaign, IL: Human Kinetics;1994: 724.
4. Forwood MR, Burr DB. Physical activity and bone mass: Exercise in futility. *Bone Miner* 1993;21:89-112.
5. Hangartner TN. Osteoporosis due to disuse. *Phys Med Rehab Clin NA* 1995;6:579-594.
6. Krall EA, Dawson-Hughes B. Walking is related to bone density and rates of bone loss. *Am J Med* 1994;96:20-26.
7. Lanyon LE. Functional strain in bone tissue as an objective and controlling stimulus for adaptive bone remodel-

ing. *J Biomech* 1987;20:1083-1093.
8. McClung MR, Spencer K. Nonpharmacologic therapy for osteoporosis. In: Rosen CJ, ed. *Osteoporosis - Diagnostic and Therapeutic Principles.* Totowa, NJ: Humana Press; 1996:189.
9. Nelson ME, Fiatarone MA, Morganti CM et al. Effects of high-intensity strength training on multiple risk factors for osteoporotic fractures. *JAMA* 1994;272:1909-1914.

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PHYSICIANS:

To assist you in encouraging your patients to become more physically active, the Rhode Island Department of Health is developing a patient physical activity assessment and counseling tool for physicians and other primary care providers. The package will include an assessment to determine a patient's current activity level and readiness to change; educational information on the benefits of physical activity and exercise guidelines; evaluation materials; and other useful information. This tool will help health care providers counsel patients about physical activity within the context of a patient visit.

A preview of these educational materials is included in the following insert. "Exercise Tips" can be photocopied and distributed to your patients as you discuss with them the benefits of physical activity.

To determine whether this tool is effective for patients and providers, we will evaluate the program with a pilot. If you would like to participate in the pilot phase of this project, please complete the registration card found in the insert and return it to the Department of Health.

For more information about this assessment and counseling tool or to get involved in the development of the program, call 277-1394, x118 or 277-1394, x121.

Exercise Prescription

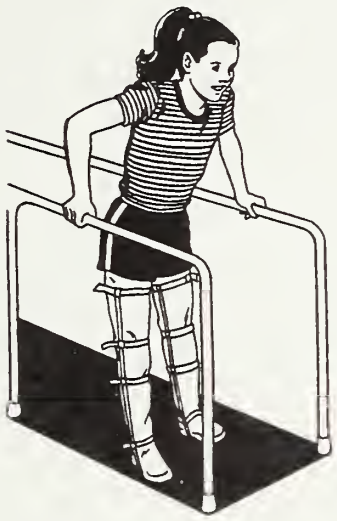
1. The two main benefits you hope to achieve from regular exercise:

   1. _____ 2. _____

   Think about these—as well as the other benefits we discussed—often.

2. The two main things that keep you from being physically active:

   1. _____ 2. _____



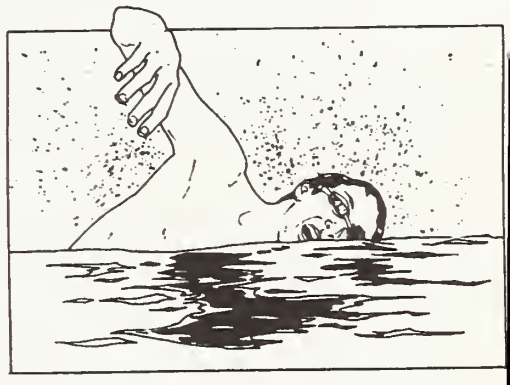
HOW TO GET PAST ROADBLOCKS

ROADBLOCK:	HOW TO GET PAST IT:
____ I do not have enough time	We're only talking about three 30-minute sessions each week. Can you do without three TV shows each week?
____ I do not enjoy exercise	Do not "exercise." Start a hobby or an enjoyable activity that gets you moving.
____ I am usually too tired to exercise	Regular activity will *improve* your energy level. Try it and see it for yourself.
____ The weather is too bad	There are many activities you can do in your own home, in any weather.
____ Exercise is boring	Listening to music during your activity keeps your mind occupied. Walking, biking, or running can take you past lots of interesting scenery.
____ I get sore when I exercise	Slight muscle soreness after physical activity is common when you are just starting. It should go away in 2-3 days. You can avoid this by building up gradually and stretching after the activity.

3. Physical activity must be regular. Plan to do an activity of your choice 3–5 times/week, for 20–45 minutes each time.

4. Choose an activity that: a.) is moderate/vigorous, b.) is convenient and practical for you, c.) you enjoy, and d.) can be done year-round (or consider alternatives for winter).

   1. _____ 2. _____



5. Prescription:

   Frequency: _____ times/week

   Intensity: Moderate/vigorous

   Type: _____

   Time: _____ minutes/session to begin, and work up to _____ minutes/session in _____ weeks.

   Keep heart rate below _____ BPM/ _____ beats/10 secs.

_____

Doctor's Signature

1997, American Diabetes Association–Rhode Island Affiliate, Rhode Island Department of Health

Exercise Tips

Talk to your doctor: If you haven't exercised in a while or have a medical problem that may prevent you from participating in some types of exercise, get a physical exam before you start. Call your doctor if you experience chest pain or dizziness when you exercise.

Start slowly: Begin by adding in light physical activity like short walks, using the stairs, etc. Slowly work your way up to longer walks and other forms of exercise (biking, swimming, dancing, etc.) that you enjoy.

Make exercise a priority: Unless you schedule it in like any other thing you have to do, you'll always leave it out. Write it in as an appointment in your calendar.

Be flexible: Push back dinner half an hour to take a walk, skip those television shows (program the VCR!), take a walk at break time instead of eating a high fat snack.

Be creative and have fun: Spend time window shopping in the mall, take country and western or tap dance lessons, sign up for a charity event that involves physical activity...there are lots of fun ways to exercise! Have "Plan B" ready for bad weather and the winter months!

Don't rely on a buddy to keep you going: While it's great to have someone to exercise with, be careful not to let that person "drag you down" when they don't feel like exercising.

Keep sneakers and work out clothes with you at all times: This way you can take advantage of every opportunity to exercise!

Water, water, water: Make sure to drink plenty of water before, during and after your workouts to prevent dehydration.

Don't give up on yourself: It takes your muscles at least two weeks of repeating the same activity to develop coordination for that activity. There will be times when you can't exercise as much as you want due to illness, a hectic work week, family problems, etc. Don't let one week off from exercise turn into two and three...keep moving any way you can until you are back into your routine again.

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Physical Activity Affects Weight Loss and Weight Management

Deborah Riebe, PhD

Obesity, defined as an excessive accumulation of fat in the body, is associated with a number of serious chronic diseases including hyperlipidemia, hypertension, non-insulin dependent diabetes mellitus (NIDDM) and coronary heart disease (CHD). Obesity is probably present if an individual's body weight is 20% or more above ideal weight. Ideal weight is commonly defined as the midpoint of the range for medium-framed individuals as shown in the 1983 Metropolitan Height and Weight Table.

The general population has become progressively more overweight since 1900, with the percentage of Americans who are obese increasing from 25% to 33% between 1980 and 1991.[1] Caloric intake has not increased commensurate with weight gain, however. In fact, per capita caloric consumption has decreased during this century, suggesting that inactivity may be more important than overeating as a cause for obesity.[2]

The increased prevalence of obesity appears to parallel a decline in average daily energy expenditure. Reports from the Centers for Disease Control and Prevention suggest that participation in vigorous activity by adults, adolescents and children has dropped substantially in the past few decades. Presently, only 15% of U.S. adults engage regularly (3 times a week for at least 20 minutes) in vigorous physical activity during their leisure time and only 22% of adults engage regularly (5 time a week for 30 minutes) in sustained physical activity of any intensity during their leisure time.[3] (For more information about the activity levels of Rhode Islanders, refer to "Levels of Physical Activity Among Rhode Island Adults" in this issue.)

Exercise and Weight Loss

Numerous studies have examined the impact of exercise training on the reduction of body weight and body fat. These studies demonstrate that exercise favorably affects body composition by promoting fat loss. Additionally, the rate of weight loss is positively related, in a dose-response manner, to the frequency and duration of the exercise sessions, as well as the duration (months, years) of the exercise program.[4]

Data collected from 19,000 people trying to lose weight found that the prevalence of overweight was highest among those reporting no physical activity and lowest among those reporting regular and intense activity. Among persons in all age groups, those who cycled, jogged or participated in aerobics weighed less than those who reported no activity. Walking was also associated with lower weight in persons over the age of 40.[5]

The rate of weight loss resulting from exercise without caloric restriction is relatively slow. Experimental studies have found that exercise alone generally produces modest loss, averaging about 6-7 pounds. Although some studies have reported substantial losses (13-26 pounds) with intensive exercise, the physical demands of these programs make them impractical for most overweight persons.[6] Despite the seemingly discouraging nature of these findings, even a modest weight loss bears clinical significance and is important from a health standpoint.

There is some evidence that adoption of an exercise program may lead to changes in the composition of the exerciser's self-selected diet. For example, the level of physical activity and the fat content of one's diet are strongly and inversely related. This may contribute to the relative ease which very active people seem to have balancing calories.[7]

A combination of mild caloric restriction and regular physical activity is more effective in reducing body fat and body weight in the obese than either approach alone. Furthermore, the addition of exercise to caloric restriction has multiple health benefits, such as a reduction of the risk for developing CHD.

Abbreviations Used:

CHD	Coronary heart disease
NIDDM	Non-insulin dependent diabetes mellitus
RMR	Resting metabolic rate
WTH	Waist-to-hip

Exercise and Fat Distribution

In addition to the effect that exercise has on weight loss and fat loss, exercise may favorably alter body fat distribution. The pattern of the body's fat tissue distribution, independent of total body fat, alters the health risks of obesity. Fat stored in the abdominal area increases one's risk of hypertension, CHD, NIDDM, and hypercholesterolemia. Ratios of waist-to-hip (WTH) girth that exceed 0.80 for women and 0.95 for men place them at a higher risk for these diseases. There is an inverse relationship between exercise and waist-to-hip ratio. A study of 2623 men and women found lower WTH in those who regularly engaged in moderate and high intensity exercise due to lower waist circumferences among exercisers.[8]

Higher intensity exercise (such as jogging) is associated with a preferential utilization of abdominal fat relative to gluteal fat. During exercise,

there is an increased release of epinephrine in the body. Epinephrine activates the breakdown of fat. Because abdominal fat is more responsive to increases in epinephrine than gluteal fat, overweight men who tend to deposit fat centrally may lose weight more quickly and easily than overweight women who tend to deposit more fat in the resistant hip and thigh region.

Weight Loss Maintenance

The relationship between exercise and maintenance of weight loss is impressive. Exercise consistently emerges as one of the best predictors of long-term weight loss maintenance. In one study, 160 policemen who were 22% above their ideal weight were randomly assigned to either exercise or no exercise, then to one of four diets. Regardless of diet, no differences in body weight were found between the initial measurement and the 18-month follow-up among the non-exercisers. In contrast, the exercise group maintained a weight loss of approximately 10-12 pounds at 18 months.[9]

The inability to maintain weight loss is of great concern in obesity treatment. The consistent finding that exercise interventions predict weight loss maintenance with a variety of programs is in contrast to the general findings that most persons regain much of the weight they lose. This finding highlights the importance of including exercise in any treatment program for obesity.

Mechanisms Linking Exercise and Weight Control

There are many pathways by which physical activity influences weight. Every physical activity, no matter how small, expends energy. For example, assuming no other changes, an average-weight male would lose 6 pounds in one year by walking up and down two flights of stairs per day instead of using an elevator.[10] Small but regular increases in physical activity, as well as planned, structured exercise sessions, produce cumulative energy expenditure.

Other physiologic and metabolic effects link exercise to weight control. For example, exercise enhances metabolic rate. Caloric restriction is often followed by a decline in resting metabolic rate (RMR). This can begin within 2 days of the restriction and can increase to up to 20% of the original RMR within 2 weeks if the restriction continues. Since RMR is the largest component of daily energy expenditure, a decrease has important implications for energy balance and represents a potential barrier against continued weight loss.[6] By conserving or even increasing lean body tissue (muscle, bone), exercise blunts the drop in RMR that frequently accompanies weight loss. Frey-Hewitt et al.[11] compared RMR changes in moderately overweight men following participation in a 1-year program of either diet or exercise. The diet group showed a significant decline in RMR, while the exercise group showed no change. These findings are strengthened by the fact that the exercise group lost significant amounts of weight and fat mass even though there were no changes in energy intake.

... an average-weight male would lose 6 pounds in one year by walking up and down two flights of stairs per day instead of using an elevator.

Many individuals fear that exercise will increase their appetite. Most studies have found that although food intake may increase with additional energy expenditure, that increase is not commensurate with the additional activity. In fact, increases in physical activity from low to moderate levels do not increase food intake and may even suppress appetite.[6]

Conclusion

Exercise is important for weight loss and critical for weight loss maintenance. However, its role in the prevention of obesity should not be overlooked. Physically active individuals generally weigh less and have less body fat than their inactive counterparts. There is a need to promote exercise to everyone, even those with ideal body weight. The adoption of even a modest exercise program helps individuals to look and feel better and manage their weight. Additionally, they gain the many other benefits of regular physical activity.

References

1. Kuczmarski RJ, Flegal KM, Campbell SM, Johnson CL. The increasing prevalence of overweight among US adults. The National Health and Nutrition Examination Surveys, 1960-1991. JAMA 1994;272:205-211.
2. Wood PD. Clinical applications of diet and physical activity in weight loss. *Nutr Rev* 1996;54:S131-S135.
3. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
4. DiPietro L. Physical activity, body weight, and adiposity: an epidemiologic perspective. *Exerc Sports Sci Rev* 1995; 23:275-303.
5. DiPietro L, Williamson DF, Casperson CJ, Eaker E. The descriptive epidemiology of selected physical activities and body weight among adults trying to lose weight: the Behavioral Risk Factor Surveillance System Survey, 1989. *Int J Obes* 1993;17:69-76.
6. Grilo, CM The role of physical activity in weight loss and weight loss management. *Med Exerc Nutr Health* 1995;4:60-76.
7. Simoes EJ, Byers T, Coates RJ, et al. The association between leisure-time physical activity and dietary fat in American adults. *Am J Public Health* 1995;85:240-244.
8. Tremblay A, Despres J-P, Leblanc C, et al. Effect of intensity of physical activity on body fatness and fat distribution. *Am J Clin Nutr* 1990;51:153-157.
9. Pavlou KN, Krey S, Steffee WP. Exercise as an adjunct to weight loss and maintenance in moderately obese subjects. *Am J Clin Nutr* 1989;49:1115-1123.

10. Brownell KD, Stunkard AJ, Alboum. Evaluation and modification of exercise patterns in the natural environment. *Am J Psychiatr* 1980;137: 1540-1545.
11. Frey-Hewitt B, Vranizan KM, Dreon DM, Wood PD. The effect of weight loss by dieting or exercise on resting metabolic rate in overweight men. *Int J Obes* 1990;14:327-334.

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The Psychological Benefits of Exercise

Robert J. Sonstroem, PhD

Researchers have examined the association between exercise and psychological variables, including anxiety, depression, mood, and self-esteem. For each of these variables, exercise has been associated with improved psychological well-being,[1] although difficulties inherent in conducting field research and the high social desirability accorded exercise limit the number and validity of firm conclusions. Most particularly, it is difficult to establish a cause and effect relationship because many investigations, especially epidemiological ones, have assessed physical activity and psychological benefits simultaneously.

However, a preponderance of experimental research does support a causal relationship between exercise and reduced anxiety.[2,3] In the short term, exercise appears to reduce anxiety levels in non-clinical populations for up to several hours post-exercise. In the long term, moderate levels of exercise continued over weeks or months have been associated with reductions in trait anxiety (chronic anxiety). Because of both the episodic and the continuous mental health benefits associated with exercise, an on-going program of regular physical activity may have a protective effect that can lead to the maintenance of psychological health. Although most of the studies in anxiety have been conducted on subjects with scores in the normal range, further research may validate exercise as a modality in the treatment of anxiety disorders.[2]

Physical activity appears to possess a causal role in both the prevention and reduction of mild and moderate depression.[1,4] Similar to the results of research relating activity to anxiety, sedentary lifestyles are recognized as a risk factor for depression.[1] The presence of regular physical activity reduces the likelihood of developing depressive symptoms. Exercise can improve the mental health of persons reporting various mood disturbances, including symptoms of clinical and non-clinical depression.[1,4] It has become a viable adjunctive therapy for many clinical psychologists. These results are supported by the finding that some people who suffer chronic episodes of depression report having self-selected exercise because it makes them feel better.

For a majority of people, the most effective programs include activities of moderate intensity, lasting 20-60 minutes, scheduled most days of the week, featuring aerobic activity ... and which are devoid of competition (although some individuals may treasure competition).

The psychological benefits of exercise for people with good mental health are less clear. While inventory scores of non-depressed people are often not influenced by physical activity, participants in exercise studies generally report improved psychological well-being after exercise.[5]

Other research has associated physical activity over extended periods of time with improved mood and increased self-esteem. Positive self-esteem changes are more apt to occur in people with initially lower self-esteem scores or in those who believe that the achievement of fitness is very important.[6]

Exercise science has continued to search for causes responsible for these psychological benefits. Physiological mechanisms such as endorphins, serotonin, norepinephrine or body temperature are often hypothesized as factors in the cases of anxiety and depression.[7] Psychological mechanisms such as goal attainment, sociability, and feelings of competence are mentioned as possible facilitative agents in the cases of self-esteem and depression.[6] The process of change involves the interaction of complex organisms with a complex environment—a process different among people.

To date, the amount of exercise needed to achieve maximal psychological benefits is unknown. This amount, as well as a threshold value for receiving benefits, appears to vary with the individual. Although some studies have provided evidence to support a dose-response relationship between lev-

els of activity and psychological well-being,[8] other studies have shown that too much exercise can have negative effects.[4,9] For example, very intensive exercise may be contraindicated in the case of high anxiety patients.

It should be emphasized that receiving psychological benefit from physical activity does not depend upon the attainment of high levels of physical fitness. This coincides with a change in exercise guidelines from an emphasis on fitness achievement to an emphasis on exercise for health purposes.[1,10] This change was indicated by the realization that most studies found that the greatest difference in all-cause mortality was between those who were least active (or least fit) and those who were moderately active or fit. While intensive exercise continues to be recommended for those who find it more enjoyable, it is not necessary in obtaining benefits of physical activity.

For a majority of people, the most effective programs include activities of moderate intensity, lasting 20-60 minutes, scheduled most days of the week, featuring aerobic activity (less research has been done with weight training) and which are devoid of competition (although some individuals may treasure competition). Most importantly, the activity should be pleasing and enjoyable. When all of these factors are present, physical activity can improve the psychological well-being of an individual, adding one more benefit to the long list of benefits of an active life.

References

1. U.S. Department of Health and Human Services. Physical Activity and Health: A *Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
2. Raglin JS. Anxiolytic effects of physical activity. In: Morgan WP, ed. *Physical Activity and Mental Health.* Washington, DC: Taylor and Francis; 1997:107-126.
3. Landers DM, Petruzzello SJ. Physical activity, fitness, and anxiety. In: Bouchard C, Shepard RJ, Stephens T, eds. *Physical Activity, Fitness, and Health: International Proceedings and Consensus Statement.* Champaign, IL: Human Kinetics; 1994:868-882.
4. Morgan WP. Physical activity, fitness, and depression. In: Bouchard C, Shepard RJ, Stephens T, eds. *Physical Activity, Fitness, and Health: International Proceedings and Consensus Statement.* Champaign, IL: Human Kinetics; 1994:851-867.
5. King AC, Taylor CB, Haskell WL. Effects of differing intensities and formats of 12 months of exercise training on psychological outcomes in older adults. *Health Psychol* 1993;12:292-300.
6. Sonstroem RJ. Physical activity and self-esteem. In: Morgan WP, ed. *Physical Activity and Mental Health.* Washington, DC: Taylor and Francis; 1997:127-143.
7. Morgan WP, ed. Physical Activity and Mental Health. Washington, DC: Taylor and Francis; 1997.
8. Paffenbarger RS Jr, Lee I-M, Leung R. Physical activity and personal characteristics associated with depression and suicide in American college men. *Acta Psy Scand Suppl* 1994;377:16-22.
9. Polivy J. Physical activity, fitness, and complusive behaviors. In: Bouchard C, Shepard RJ, Stephens T, eds. *Physical Activity, Fitness, and Health: International Proceedings and Consensus Statement.* Champaign, IL: Human Kinetics; 1994:883-897.
10. Centers for Disease Control and Prevention and American College of Sports Medicine. Summary statement: Workshop on physical activity and public health. *Sports Med Bull* 1993;28:7.

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The Barriers to Physical Activity

The potential health problems associated with exercise, particularly in some individuals, must not be ignored, but should be viewed in the context of the substantial benefits. There are also many ways to reduce the risk of injury and eliminate physical barriers to exercise.

Potential Adverse Effects

Arnold-Peter C. Weiss, MD

This discussion of potential adverse effects of physical activity should be taken in context of the substantial benefits of exercise. As with anything else in life, every action has a reaction. Individuals decide whether to pursue an activity based on a risk/benefit ratio. The overall advantages of undertaking physical activity far outweigh possible detrimental aspects. For almost all individuals (except those with significant pre-existing medical problems), exercise will improve health. In patients who do have difficult medical disorders, carefully guided exercise protocols can provide substantial benefit while keeping potential risks of further injury in check. A corollary can be made to the use of air bags in automobiles. There is irrevocable proof that air bags save many lives in high speed impact collisions. Nevertheless, these same life-savers can take life when children are involved, even at low speeds. As we get into our automobiles, each of us makes this classic risk/benefit ratio analysis. The new findings do not indicate that air bags should be taken out of vehicles, but rather that their use should be judicious. The same argument applies to physical activity.

Detrimental Effects

Adverse effects of physical activity generally involve two types of injuries. The first involves an acute tear of muscle or tendon or in severe cases broken bones. In general, these injuries are not seen in the majority of individuals undertaking physical activity at reasonable, health-promoting levels. These injuries are a bit similar to high speed motor vehicle accidents in that they require a fairly high level of performance to even achieve the forces required to tear strong tendons, muscles and bones.

By far the most common problems relate to prolonged exercise without appropriate regulation or warm-up. Muscles, tendons, ligaments, and bones are generally injured when they are stretched or forced beyond their normal length causing a "sprain." Many runners have suffered from "shin splints," which actually represent microfractures along the lower leg from continual pounding on pavement. Individuals with exercise-induced asthma frequently will not be able to complete their normal routines unless they regulate their activity and medication carefully prior to undertaking exercise. Similarly, individuals who suffer from heart disease need to be extremely careful to increase their endurance in a slow, progressive manner under physician guidance to avoid overstressing the cardiovascular system.

Stretching of muscle and tendon units before exercise is probably the single best activity that one can do to avoid injury.

How to Avoid Detrimental Effects

Stretching Before Exercise.

Stretching of muscle and tendon units before exercise is probably the single best activity that one can do to avoid injury. Stretching plays a real physiologic role in that it lengthens the muscle fibers before an activity; this allows a bigger range of motion through which the muscles can work during the activity without tearing tissue. For most activities (i.e., running, tennis, weight lifting, etc.), at least fifteen minutes of stretching exercises should be performed beforehand. The main difficulty with this is that most of us are too impatient: we don't spend the time required to get the muscles stretched and warmed enough to avoid tearing and local injury. A speedier alternative is to stretch for two or three minutes and then begin the activity at a lower level (a very slow jog for five minutes prior to resuming the normal work-out speed), allowing the muscles to accommodate to the activity being performed.

Heat and Ice.

The use of heat and ice can aid in reducing swelling associated with physical activity and increase blood flow to the muscles being used. Normally heat is better than ice for use before an activity (i.e., increasing the blood flow to the muscles and improving the oxygen balance of the muscles themselves) and ice is better after the activity to reduce any swelling. Ice in general does not have to be used unless an individual has had a previous injury or is overcoming a recent injury to try to keep the swelling to a minimum. Other than the physiological roles of heat and ice, they also simply make patients feel better after an activity - probably the largest reason for their use.

Controlled Increase in Activity.

As your car dealer will tell you over and over, accelerating from a stoplight quickly is not only bad for the engine but wastes gas. The same situation applies to physical activity. An individual who has not lifted weights for several months and goes to the gym trying to impress others will be at much higher risk for injury than if he increases the weights slowly over several weeks. The best advice to give patients is to encourage them to swallow their pride and increase their activity levels gradually, allowing the muscles and other organs to accommodate to the increased activity and reducing the level of injury risk.

Equipment.

The use of appropriate equipment for physical activity is important. In high impact sports (i.e., football, hockey), equipment can be the only protection when the individual does not have the chance to react to the play on the field. In these high impact sports, well fitting and high quality equipment can be the most important aspect of injury prevention . Likewise, long distance runners - especially those who run on hard surfaces like pavement - should choose shoes with excellent shock absorbing capabilities. Tennis racquets should be strung at a tension that will not transfer too much stress to the muscles and tendons, especially to the insertion points of these tissues on the bones, even if this slightly reduces performance. Spending the extra dollar on good equipment will pay back benefits in equipment longevity as well as reduced injury rates.

Conclusion

Although there can be adverse effects to physical activity and each reader will sooner or later come up with some problem related to exercise, the majority of these can be well controlled and the risk of injury minimized by remembering that our bodies are not machines but carefully interwoven soft tissues which require as much attention as the other things we cherish. Gradual progression from one level to the next in any physical activity will reduce the overall risk of injury and enhance the benefits of physical activity.

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Physical Limitations to Exercise: What They Are; How to Overcome Them

Sarah Everhart, MPH

The Need

All people need to maintain and develop physical fitness. People with a physical disability have an even greater need for fitness. As a whole, they tend to be less active and less fit than the general population.[1] The consequences of sedentary living can be devastating for inactive disabled persons who are particularly vulnerable to the negative effects of declining fitness.

Aerobic fitness (exercise that increases the heart rate for at least 20 minutes) and strength training help those with physical disabilities maintain functional independence and a healthy life. Furthermore, regular physical activity is important in weight control and in increasing HDL cholesterol levels, both of which have been shown to reduce the risks of cardiovascular disease (CVD). Because CVD is associated with a sedentary lifestyle, it is important that those at high risk incorporate physical activity into their lives in order to decrease the chances of developing secondary disabilities and conditions leading to premature death.

Abbreviations Used:

CVD Cardiovascular disease

The Barriers

Individuals with physical limitations face many barriers to participation in exercise programs, particularly in the community setting. A primary obstacle is a lack of programs within facilities that can accommodate the needs of clients with disabilities. This is due to gaps in knowledge among community exercise leaders and rehabilitation professionals about the importance of physical fitness for people with disabilities. Likewise, some agencies cannot afford to modify existing structures. In addition, physicians may not be informed of community resources for physical activity for people with physical limitations.

Disability itself presents physical, social and psychological barriers which further hinder participation in community-based activities.[1] Factors such as the increased energy demands of ambulation or wheelchair propulsion combined with the existence of architectural barriers and limited accessible transportation make it easier for the

person with a disability to avoid activity. Social stigmas and negative stereotypes, compounded by the poor self-concept and negative body image common to persons with physical disabilities, further obstruct the desire to participate in physical activity in a public setting.

One of the most common physical limitations to exercise is arthritis. The May, 1997 issue of MMWR discusses physical activity for people with limitations due to arthritis. Arthritis and other rheumatic conditions are the leading cause of disability in the U.S., and persons with arthritis and other rheumatic conditions are significantly less active than the general population[2] - in part because they mistakenly fear joint damage from exercise. The Surgeon General's Report, *Physical Activity and Health,* found that for persons with osteoarthritis "regular physical activity is necessary for maintaining normal muscle strength, joint structure, and joint function...and was not associated with joint damage or development of osteoarthritis and may be beneficial for many people with arthritis."[3] Of course, evaluation of patients' conditions is a requisite for the recommendation to increase physical activity.

The Answer In New England

Despite the barriers, successful mainstream fitness programs for persons with physical disabilities exist. Disabled Sports USA (previously known as National Handicapped Sports) conducts training programs and exercise classes to serve disabled participants nationwide. There are DS/USA Chapters in Massachusetts and New Hampshire which provide sports and recreation opportunities including windsurfing, sailing, skiing, etc.

Rhode Island has several organizations dedicated to sports and recreation for people with disabilities. The Rhode Island Rhode Runners, Wheels & Heels, Inc. and the United States Cerebral Palsy Athletic Association manage individuals and teams of individuals with disabilities, and run sporting events throughout the state for people with disabilities. The Summit Association of RI for the Handicapped offers a self-help, educational-recreational program designed to meet the needs of people with disabilities.

Rhode Island is also home to Shake-A-Leg, Inc., in Newport. This organization operates summer programs for people with disabilities including adaptive sailing using specially-designed boats and a second-stage rehabilitation program for people with neurological dysfunction, especially spinal cord injury. Shake-A-Leg will be opening a year-round fitness center for people with physical disabilities.

There are approximately 49 million people with disabilities in the United States today who deserve the opportunity to reap the benefits of exercise and activity. Please help educate your patients and colleagues about their options!

References

1. Miller P. Fitness *Is For Everyone: Adapted Fitness Instruction Manual.* Rockville, MD: National Handicapped Sports; 1991.
2. Centers for Disease Control and Prevention. Prevalence of leisure-time physical activity among persons with arthritis and other rheumatic conditions, United States, 1990-1991. *MMWR* 1997;46:389-393.
3. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.

Resources:

Arthritis Foundation
(800) 283-7800

Community Boating, Inc., Boston, MA
Bill Pendleton, (617) 523-1038

New England Handicapped Sports Association, Mt. Sunapee, NH
Amy Lane, (800) 628-4484

Northeast Passage, Durham, NH
Jill Gravink, (603)862-0070

Rhode Island Rhode Runners, North Kingston, RI
(401) 884-6623

Shake-A-Leg, Inc., Newport, RI
Sailing Director, Robie Pierce, (401) 846-5549
Program Director, Sarah Everhart, (401) 849-8898

United States Cerebral Palsy Athletic Association, Newport, RI
Program Coordinator, Kim Kavanagh, (401) 848-2460

United States Integrated Windsurfing, Acton, MA
Ross W. Lilley, (508) 263-2332

Waterville Valley Disabled Athletics Program, Waterville Valley, NH
Kathy Chandler, (603) 236-8311x 5500

Wheels & Heels, Inc., Cranston, RI
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White Mountain Adaptive Ski School at Loon, Loon Mountain, NH
Robert Harney, MD, (603) 745-8111x 5663

The local YMCA may have an accessible swimming pool.

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The Value of Physician Counseling

Although regular physical activity for patients takes place outside the health care setting, its promotion should be an important part of both wellness and illness care. Behavioral science is adding rapidly to the body of knowledge of how to change individual behavior, and it is well demonstrated that physicians can have a significant positive impact on that change.

The Challenge of Behavior Change

Bess H. Marcus, PhD, and LeighAnn H. Forsyth, PhD

According to data from the Behavioral Risk Factor Surveillance System (BRFSS), 58% of adults in the United States are sedentary.[1] Health care providers often assume that sedentary individuals are ready to increase their level of physical activity, but this is not always the case. Research findings indicate that the majority of inactive people are not motivated to increase their participation in physical activity.[2] Clinical intervention trials to increase participation in physical activity tend to produce only modest improvements, and these gains typically decline when the intervention ends.[3] Thus, motivating individuals to adopt a more physically active lifestyle and maintain their behavior change over time constitutes a public health challenge.

Within the last decade, behavioral scientists have identified general principles and strategies for enhancing motivation and behavior change toward a more active lifestyle. One concept central to behavior change is that individuals vary in their motivational readiness to change their behavior.[4,5] Five different stages of motivational readiness have been identified for physical activity adoption: 1) Precontemplation (no intention of changing in the next 6 months), 2) Contemplation (considering change in the next 6 months but not yet making changes in behavior), 3) Preparation (making some changes, but not at goal level), 4) Action (the first 6 months of active change in behavior), and 5) Maintenance (sustained change past 6 months).[2]

Abbreviations Used:

BRFSS Behavioral Risk Factor Surveillance System

Choosing Strategies for Behavior Change

Identifying an individual's motivational readiness for change is useful because the strategies for promoting behavior change vary according to stage of readiness.[4,5] For instance, those in earlier stages benefit more from cognitive interventions (e.g., listening to lectures, reading books), while individuals in later stages depend more on behavioral techniques (e.g., reminders to exercise, social support).[2] Mediators of physical activity change include decisional balance (an individual's perceived ratio of benefits to barriers) and self-efficacy (self-confidence in one's ability to be physically active, even in difficult situations like vacation and bad weather); these mediators also can be targeted to enhance behavior change.[6-8] The stages of change framework, along with proven mediators of change (i.e., cognitive/behavioral processes, decisional balance, and self-efficacy) have been central to the design and delivery of physical activity interventions for community samples,[9, 10] the workplace,[11] and primary care settings.[12-14] Importantly, tailoring interventions to motivational readiness has been shown to outperform standardized "action-oriented" interventions.[10,11] Although a sedentary individual may not immediately become a physically active person following intervention, prompting that individual to begin considering increasing their activity is recognized as an important public health outcome.[15]

Until recently, 30 minutes of vigorous activity at least 3 times weekly was promoted as the dose necessary for health benefits.[16] Major health organizations now recognize that moderate lifestyle activity (e.g., brisk walking, raking leaves) performed for a total of 30 minutes on at least five days of the week also improves health.[17] Promoting moderate lifestyle activity has important implications for meeting the challenge of getting sedentary individuals to be more active. For example, some individuals may feel more comfortable with home-based programs rather than going to an exercise facility where one's appearance and skill are on display. Some may be unable to incorporate 30 minutes of continuous exercise into their daily routine. Because these recommendations are new, many may not be aware that health benefits can be obtained by activity performed in shorter bouts throughout the day. This approach also counteracts all-or-none thinking (e.g., "If I

can't exercise for 30 minutes, I might as well not exercise at all today") that leads to relapse. Recognizing and acknowledging the difference in preferences is essential for individually-tailoring counseling messages.[9-13]

Enhancing Behavior Change

The following descriptions demonstrate how interventions can be tailored via the stages of change model. These strategies can be applied to promotion of vigorous activity, structured exercise programs, or moderate lifestyle activity. The counseling message given varies according to an individual's motivational readiness to become physically active.

Precontemplation

The precontemplator is unlikely to follow up on recommendations or is likely to prematurely drop-out of exercise.[2] Also, those in this stage may not be aware of the risks associated with being sedentary. Even if they have learned health risks associated with their inactivity, precontemplators may be discouraged by previous failures to become or remain active. Therefore, precontemplators are more likely to benefit from a discussion of the harmful implications of inactivity, rather than an exercise prescription. Their past failures in exercise may have diminished their confidence in their ability to become active again. Helping these individuals analyze why they were not able to stay active in the past may bolster self-efficacy.

Contemplation

Contemplators believe the reasons for remaining inactive (i.e., I am too tired, exercise takes too much time) outweigh the benefits of exercise.[6] These individuals will benefit most from a discussion of the benefits associated with physical activity and problem-solving ways to reduce perceived barriers to becoming active. Also, encouraging these individuals to set short-term goals (i.e., exercise for 10 minutes once this week) is a critical way to help them gain confidence and move toward an active lifestyle.

Preparation

These individuals are irregular exercisers; therefore, they will benefit most from advice and counseling on establishing a regular exercise program. Further reducing perceived barriers, as well as continuing to build confidence are important at this stage.[6-8] This in part can be accomplished by encouraging those in preparation to reward themselves for small steps. Reinforcing small steps toward action is called "shaping;" by gradually "shaping" increases in time, intensity, and adherence to exercise, individuals will eventually work up toward beneficial levels.

In a culture that is becoming increasingly automated, motivating individuals to choose to be active remains a great challenge.

Action

Individuals who recently have begun regular exercise will benefit from instruction on avoiding injury, boredom, and burn-out. Active individuals should be encouraged to incorporate several forms of exercise and/or locations into their routine to decrease boredom. Additionally, providing these individuals with social support for their newly started activity (i.e., occasionally asking them how it is going, praising them for being active) has been shown to be one of the most important contributors to maintaining activity.[18]

Even though an individual is currently successful at regular exercise, it is important to remember that new exercisers are at risk for discontinuing their participation. This risk is reduced if individuals are assisted in planning for risky relapse situations such as vacations, sickness, bad weather, and increased time demands; however, if an individual does have a short lapse, this situation is a good opportunity for learning how to avoid future lapses by developing specific coping strategies. This is a more constructive approach than having the individual become upset or discouraged at the setback.

Maintenance

After six months of regular activity, individuals are considered to be in the maintenance stage. These individuals most likely have developed some strategies to cope with barriers to regular activity, but they still remain at risk for dropping out of exercise. Scheduling an appointment to "check-in" can help the maintainer to monitor progress and keep motivated. Providing continued feedback will help the individual maintain confidence that she or he can remain active, even in difficult situations.

Summary

In a culture that is becoming increasingly automated, motivating individuals to choose to be active remains a great challenge. Recognizing that individuals differ in their motivation to become active and then tailoring the counseling message according to the individual's readiness for change have been shown to help spur behavior change. Developing means for designing interventions for moderate activity and additional recommendations for patient-treatment matching will help to promote physical activity.

References

1. Centers for Disease Control and Prevention. Prevalence of Sedentary Lifestyle-Behavioral Risk Factor Surveillance System, United States, 1991. *MMWR* 1993;42:576-579.
2. Marcus BH, Rossi JS, Selby VC, et al. The stages and processes of exercise adoption and maintenance in a worksite sample. *Health Psychol* 1992;11:386-395.
3. Dishman RK, Buckworth J. Increasing physical activity: A quantitative synthesis. *Med and Sci Sports Exerc* 1996;706-719.
4. Prochaska JO, DiClemente CC. Transtheoretical therapy: Toward a more integrative model of change. *Psychotherapy: Theory, Research, and Practice* 1982;20:161-171.
5. Prochaska JO, DiClemente CC. Stages and processes of self change of smoking: Toward an integrative model. *J Counsult Clin Psychol* 1983;51:390-395.
6. Marcus BH, Rakowski W, Rossi JS. Assessing motivational readiness and decision-making for exercise. *Health Psychol* 1992;11:257-261.
7. Marcus BH, Owen N. Motivational readiness, self-efficacy and decision-making for exercise. *J Appl Soc Psychol* 1992;22:3-16.
8. Marcus BH, Selby VC, Niaura RS, Rossi JS. Self-efficacy and the stages of exercise behavior change. *Res Q Exerc Sport* 1992;63:60-66.
9. Marcus BH, Banspach SW, Lefebrve RL, et al. Using the stages of change model to increase the adoption of physical activity among community participants. *Am J Health Promotion* 1992;6:424-429.
10. Marcus BH, Bock BC, Traficante R, et al. Efficacy of an individualized-motivationally-tailored approach to increasing exercise behavior. *Annals of Behav Med* 1997; 19:S039.
11. Marcus BH, Emmons KM, Linnan L, et al. Evaluation of stage-matched versus standard self-help physical activity interventions in the workplace. *Am J Health Promotion.* In press.
12. Long BJ, Calfas, KJ, Wooten W, et al. A multi-site field test of the acceptability of physical activity counseling: Project PACE. *Am J Prev Med* 1996;12:73-81.
13. Marcus BH, Goldstein MG, Jette A, et al. Training physicians to conduct physical activity counseling. *Prev Med.* 1997;26:382-388.
14. Calfas J, Long BJ, Sallis JF, et al. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med* 1996;25:225-233.
15. McKinlay JB. The new public health approach to improving physical activity and autonomy in older populations. In: Hikkinen E, ed. *Preparation for Aging.* New York, NY: Plenum Press; 1995.
16. American College of Sports Medicine. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in healthy adults. *Med Sci in Sports and Exer* 1990; 22:265-274.
17. U.S. Department of Health and Human Services. *Physical Activity and Health: A Report of the Surgeon General.* Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 1996.
18. Wankel LM. Decision-making and social support strategies for increasing exercise involement. *J Cardiac Rehabil* 1984; 4:124-135.

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Physician-Delivered Physical Activity Counseling

Bernardine M. Pinto, PhD, and Michael G. Goldstein, MD

Despite increasing evidence of the benefits of physical activity, data from the Behavioral Risk Factor Surveillance System (BRFSS) show that 58% of the U.S. population is sedentary (irregular or no leisure time activity).[1] The U.S. Preventive Services Task Force,[2] after reviewing literature on the potential impact of physician counseling, recommended that clinicians counsel all patients to engage in a program of regular physical activity tailored to their health status and personal lifestyle.[3] More specifically, one of the national health promotion objectives for the Year 2000 is to increase to at least 65% the percentage of primary care providers who assess and counsel their patients about physical activity.[4]

Physicians' Role in Activity Counseling

Seventy percent of adults report at least one physician contact each year,[5] offering physicians an opportunity to counsel patients about physical activity. The vast majority of these patients either have a medical condition that would benefit from adoption of regular physical activity (e.g., cardiovascular disease, obesity) or are at risk for such a condition. Office visits by patients with these conditions or risks are "teachable moments" in which counseling is most likely to be effective. In general, patients are concerned about their lifestyle and would welcome relevant counseling from their health care provider. For example, in one survey, patients thought their personal physician wanted them to exercise and were motivated to comply with their physician's advice.[6]

Although physicians endorse the value of physical activity,[7] the rate of physical activity counseling by physicians is generally low.[8] A survey of a random national sample of 1,349 internists found that less than half counseled all their patients about physical activity, and only 15% counseled inactive patients for at least 5 minutes at every visit.[9] Physicians are more likely to provide physical activity counseling for high risk patients (64%) than during preventive check-ups on healthy patients (29%).[10] In patient surveys, the rate of physical activity counseling reported has been substantially lower (3-6%).[11]

Abbreviations Used:

BRFSS Behavioral Risk Factor Surveillance System

Physicians can play a vital role in reducing the sedentary lifestyle of American adults by providing brief exercise counseling.

As for the content of activity counseling, research has suggested that most physicians do not provide a thorough intervention. In a survey of physicians in Alabama, while 91% of respondents "encouraged" patients to participate in regular physical activity, 70% did not develop exercise prescriptions and only 23% were familiar with the American College of Sports Medicine guidelines for exercise prescriptions.[12] On a more positive note, Russell and Roter[13] reviewed audiotapes of primary care practice visits with chronic disease patients and found physicians delivered several specific components of exercise counseling, including discussion of the short-term benefits of exercise, personal disclosure, shaping and enlisting support from family members.

Recognition of the potentially vital role that physicians can play in reducing sedentary behavior among their patients has prompted efforts to train physicians about physical activity counseling. Preliminary studies have shown that physician-delivered counseling can increase patients' physical activity levels.[14-16] Logsdon and colleagues[14] found a 40% greater rate of starting to exercise among patients who received exercise counseling from their primary care physicians than among patients who did not receive such counseling. In Project PACE (Provider-based Assessment and Counseling for Exercise),[17] twelve primary care physicians provided three to five minutes of physical activity counseling, tailored to the patient's level of activity and readiness to become active. Patients also received a booster telephone call from a health educator. The PACE program was effective in preparing providers to perform physical activity counseling and was generally acceptable to physicians, office staff and patients.[18] Patients receiving the counseling significantly increased their duration of walking and demonstrated a greater readiness to become active than patients not receiving physical activity counseling.[17]

Hence, research data suggest that physicians can enhance the level of physical activity of their patients, and patients appear to be motivated to comply with physicians' counseling. Physicians can play a vital role in reducing the sedentary lifestyle of American adults by providing brief exercise counseling. The current low prevalence of activity counseling points to the necessity of identifying and overcoming the barriers to such counseling. Educational efforts combined with office-based interventions

that help to integrate physical activity counseling into routine practice have shown promise in increasing physician-delivered physical activity counseling.

References

1. Centers for Disease Control and Prevention. Prevalence of Sedentary Lifestyle-Behavioral Risk Factor Surveillance System, United States, 1991. *MMWR* 1993;42:576-579.
2. Harris SS, Caspersen CJ, DeFriese GH, Estes H Jr. Physical activity counseling for healthy adults as a primary preventive intervention in the clinical setting: Report for the U.S. Preventive Services Task Force. *JAMA* 1989;261:3590-3598.
3. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services: An Assessment of the Effectiveness of 169 Interventions.* Baltimore, MD: Williams & Wilkins; 1989:297-304.
4. U.S. Department of Health and Human Services. *Promoting Health/Preventing Disease Year 2000 Health Objectives for the Nation.* Washington DC: 1990.
5. U.S. Department of Health and Human Services. Vital and Health Statistics. *Physician Contacts by Sociodemographic and Health Characteristics, United States, 1982-83.* Hyattsville, MD: U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, 1987; DHHS Publication No. (PHS) 87-1589.
6. Godin G, Shephard RJ. An evaluation of the potential role of the physician in influencing community exercise behavior. *Am J Health Promotion* 1990;4:255-259.
7. Reed BD, Jensen JD, Gorenflo DW. Physicians and exercise promotion. *Am J Prev Med* 1991;7:410-415.
8. Lewis CE, Wells KB, Ware J. A model for predicting the counseling practices of physicians. *J Gen Intern Med* 1986;1:14-19.
9. Lewis CE, Clancy C, Leake B, Schwartz JS. The counseling practices of internists. *Ann Intern Med* 1991;114:54-58.
10. Rosen MA, Logsdon DN, Demak MM. Prevention and health promotion in primary care: Baseline results on physicians from the INSURE project on lifecycle preventive health services. *Prev Med* 1984;13:535-548.
11. Wallace PG, Brennan PJ, Haines AP. Are general practitioners doing enough to promote healthy lifestyle? Findings of the Medical Research Council's general practice research framework study on lifestyle and health. *Br Med J* 1987;294:940-942.
12. Williford HN, Barfield BR, Lazenby RB, Olson MS. A survey of physicians' attitudes and practices related to exercise promotion. *Prev Med* 1992;21:630-636.
13. Russell NK, Roter DL. Health promotion counseling of chronic-disease patients during primary care visits. *Am J Public Health* 1993;83:979-982.
14. Logsdon DN, Lazaro CM, Meier RV. The feasibility of behavioral risk reduction in primary medical care. *Am J Prev Med* 1989;5:249-256.
15. Lewis BS, Lynch WD. The effect of physician advice on exercise behavior. *Prev Med* 1993;22:110-121.
16. Marcus BH, Goldstein MG, Jette A, et al. Training physicians to conduct physical activity counseling. *Prev Med.* 1997;26:382-388.
17. Calfas K, Long BJ, Sallis JF, et al. A controlled trial of physician counseling to promote the adoption of physical activity. *Prev Med* 1996;25:225-233.
18. Long BJ, Calfas KJ, Wooten W, et al. A multi-site field test of the acceptability of physical activity counseling: Project PACE. *Am J Prev Med* 1996;12:73-81.

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The Creative Clinician: Case of the Month

The practice of medicine is an art, not a trade; a calling, not a business ..." – William Osler, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

An Ominously Low Potassium Level

Jean Smith, MD

For a month a 52 year old white male had suffered from polyuria, nocturia, polydipsia, muscle aches, weakness and paresthesias involving his extremities and perioral region. He also had felt some changes in taste sensation, as well as a persistent frontal headache. He was not taking medications, nor did he use tobacco or alcohol. He had not lost weight; he had no visual disturbance, abdominal pain, vomiting or diarrhea.

When he presented at the hospital, the only clue from his history was his service in Viet Nam, where he reported extensive exposure to Agent Orange.

Physical Examination

Physical examination revealed a well-nourished but ill-appearing, tremulous white male. Blood pressure, 160/96 mm Hg; heart rate, 92/min and regular; temperature, 99° F; respirations, 18/min. Mucosa, markedly dry; normal fundoscopy; visual fields intact; sclerae anicteric; examination of the neck, abdomen and extremities, unremarkable. Skin was anicteric and with normal turgor. Sensation was intact. Tendon reflexes were absent.

Laboratory studies [normal values in brackets]: Complete blood count normal. Blood sugar, 147 mg/dl [75-110]; BUN, 14 mg/dl [7-22]; creatinine, 1.2 mg/dl [0.7-1.4]; serum sodium, 146 mEq/L [135-145]; potassium, 1.5 mEq/L [3.5-5.2]; magnesium, 1.3 mEq/L [1.5-2.0];chloride, 88 mEq/L [98-108] and bicarbonate, 42 mEq/L [23-33]. Creatine phosphokinase, 971 IU [5-172] with MB fraction of 0.4 ng/mL [0.0-4.7]. Values on random urines: sodium, 46 mEq/L; potassium, 28 mEq/L; chloride, 52 mEq/L; creatinine, 28 mEq/L; protein, 41 mg/dl; urine pH, 8.0. Twenty-four hour urinary values: volume, 7,850 cc; sodium, 408 mEq/L [75-200]; potassium, 228 mEq/L [40-80]; chloride, 495 mEq/l [75-200]; protein, 1,178 mg/vol [0-150.] Serum osmolality, 289; urine osmolality, 219. Urinary drug analysis was negative for diuretics and other substances. Thyroid stimulating hormone level, 1.96 uIU/mL [0.38-6.15] AM serum cortisol, 13.3 UG/dl [4.0-18.0]. Arterial blood gases on room air: pH, 7.54 [7.38-7.42]; pCO_2, 50 [38-44]; pO_2 61 [70-104]; HCO_3, 42 [23-25]; saturation, 93% [94 +/- 2]. Serum aldosterone, 594 ng/dl [<16]; renin, 0.3 ng/ml [0.2-2.3]. Electrocardiogram: normal sinus rhythm; rate, 84/min; pronounced U-waves present [Figure 1]. Chest X-ray, unremarkable. MRI of pituitary, normal. CT of abdomen showed a right adrenal mass of 5 x 7 cm.

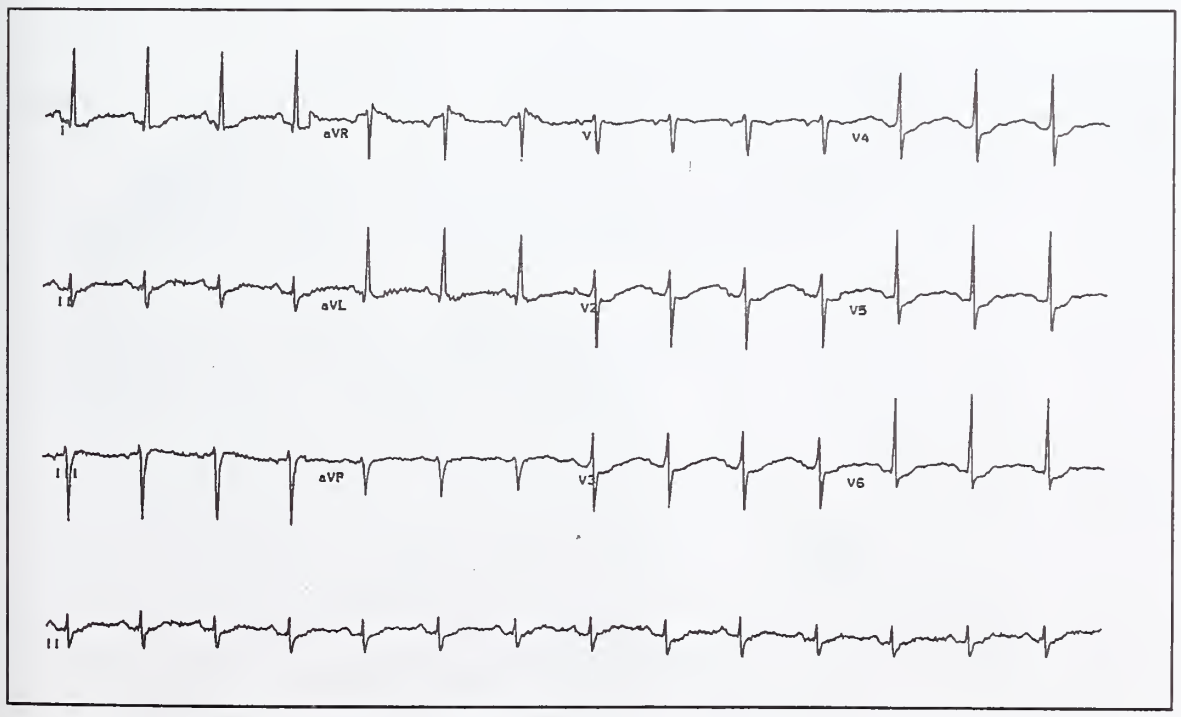

Figure 1

Discussion

The patient's history of recent polyuria, polydipsia, paresthesias and weakness at first suggested diabetes mellitus or diabetes insipidus. Headache and taste disturbance, added to a diabetes insipidus, further suggested some intracranial process. Cranial MRI, however, showed no lesion. Laboratory values, moreover, revealed a severe hypokalemia with only moderately elevated serum glucose.

The causes of severe hypokalemia, assuming no lab error, include either redistribution or depletion. Redistribution hypokalemia is seen in metabolic alkalosis, but would not be as profound as that seen in this patient. Potassium depletion, therefore, remained the possible cause. Since the 24-hour potassium was >30 mEq, the potassium loss was considered to be of renal origin. Renal potassium depletion may or may not be associated with acid-base disturbances. This patient had a metabolic alkalosis associated with a high urine chloride [> 20 mEq/L] which suggests diuretic abuse. However, the patient was hypertensive. A hypertensive hypokalemia, with elevated plasma glucose, suggests a steroid excess. The elevated plasma aldosterone confirmed excess mineralcorticoids [as opposed to glucocorticoids]. Finally, the decreased plasma renin levels pointed to a primary rather than secondary hyperaldosteronism.

The commonest causes of primary hyperaldosteronism are adrenal adenoma or bilateral adrenal hyperplasia. No abdominal masses were palpated but, as is often the case, a lesion was detected by CT scan. Aldosterone-secreting adenomas are usually small, without any particular laterality and average 1 cm or less. Often the only way to detect them is by adrenal vein sampling. Any biologically active tumor greater than 3 cm raises the suspicion of adenocarcinoma.

The symptoms now pointed to a metabolic alkalosis with profound hypokalemia caused by a mineralcorticoid excess. A hypokalemia-induced rhabdomyolysis was reflected in the elevated creatine phosphokinase level. Weakness and absence of tendon reflexes are seen in hypokalemia. An impaired renal concentrating ability caused the polyuria, polydipsia and nocturia. The tingling in the extremities and perioral region mark a decrease in available ionized serum calcium secondary to the profound metabolic alkalosis. The hypertension marks the hypernatremia and volume expansion caused by the hyperaldosternonism and not countered by the polyuria. Moderate hyperglycemia, in the absence of an elevated cortisol level, is also seen in hypokalemia. EKG findings, with prominent U-waves, are characteristic of hypokalemia.

Diagnostic Procedure

The solution was surgical: a right radical adrenalectomy. A 5 x 7 cm friable neoplasm was found, not appearing to invade the right kidney or Gerota's fascia. The excision was considered complete; the patient tolerated the procedure well.

Pathological Findings

The resected mass was brown, necrotic and hemorrhagic, with a 0.1 cm rim of compressed adrenal cortex. Microscopic examination showed a glandular neoplasm with mucinous material, a moderate degree of cellular variation with many mitotic figures and a few spindle cells, and some neoplastic invasion of local blood vessels. Diagnosis: adenocarcinoma of the adrenal cortex.

Conclusion

Carcinomas of the adrenal cortex are rare (the estimated annual incidence rate is 0.5 - 2 per million population, less than 0.05% of all malignant neoplasms).[1]

The majority of adrenal carcinomas are functional, typically generating glucocorticoids or androgens. Very few are aldosterone-producing. The functioning carcinomas tend to arise more commonly in women, particularly those aged 30 to 50. Most often they are large and highly aggressive.

Since this patient was over 40, with metastases present at the time of diagnosis, his prognosis was poor. We predicted a median survival interval of 4 to 30 months and a five year survival of 22%.[2]

Surgical resection remains the treatment of choice regardless of the stage of the tumor. Spironolactone or amiloride may be used to control the excessive hormonal production. Mitotane [o, p' DDD or 1,1-dichlorodiphenyldichloroethane] has also been shown to control hormonal secretion in some patients, with occasional tumor regression. The drug, though, has not been shown to improve survival. Furthermore, the drug has significant side effects and only a 15 - 33% response rate.[1]

After surgery, the patient's potassium levels were normal.

References

1. Wooten MD, King DK. Adrenal cortical carcinoma. *Cancer* 1993;72.
2. Luton J-P, Cerdes S, Billoud, L, et al. Clinical features of adrenocortical carcinoma. *NJEM* 1990;322.

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Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Preferred Types of Physical Activity Among Rhode Island Adults

Jana E. Hesser, PhD, and Hyun Kim, PhD

Because moderate levels of physical activity have been shown to have substantial health impact for all age groups, recent recommendations are for all people ages 2 years and older to perform at least 30 minutes of endurance-type physical activity, of at least moderate intensity, on most, preferably all, days of the week.[1] Walking, bicycling, and gardening are examples of moderate intensity physical activities.

Elsewhere in this issue, self-reported data on the levels of physical activity among Rhode Island adults indicate that 48% of adults participate in some kind of leisure-time physical activity on a regular basis, 26% participate irregularly, and the remaining 26% do not perform any leisure-time physical activity.[2] This paper presents data on the primary types of physical activity of those adults who do exercise.

Methods

Approximately 1,800 randomly selected Rhode Island residents ages 18 years and older are surveyed annually by telephone for the state's Behavioral Risk Factor Surveillance System (BRFSS).[3]

In even-numbered years, the BRFSS asks questions on respondents' leisure-time physical activity during the preceding month, including types of activity undertaken (up to two types) and number of days per week and minutes per session of exercise. Based on these questions, respondents are categorized by their levels of physical activity. (Respondents who indicated no physical activity are not included in this analysis.)

Regular and sustained physical activity ("**sustained**") — Participation in physical activity 5 or more times per week, 30 minutes or more per session, regardless of intensity.

Moderate regular physical activity ("**moderate**") — Participation in physical activity 3-4 times per week, 30 minutes or more per session, or 3 or more times per week, 20-29 minutes per session, regardless of intensity.

Irregular physical activity ("**irregular**") — Participation in some physical activity, but less than 3 times per week and/or less than 20 minutes per session.

BRFSS data for 1992 and 1994, the two most recent years for which exercise data are available, were combined for analysis.

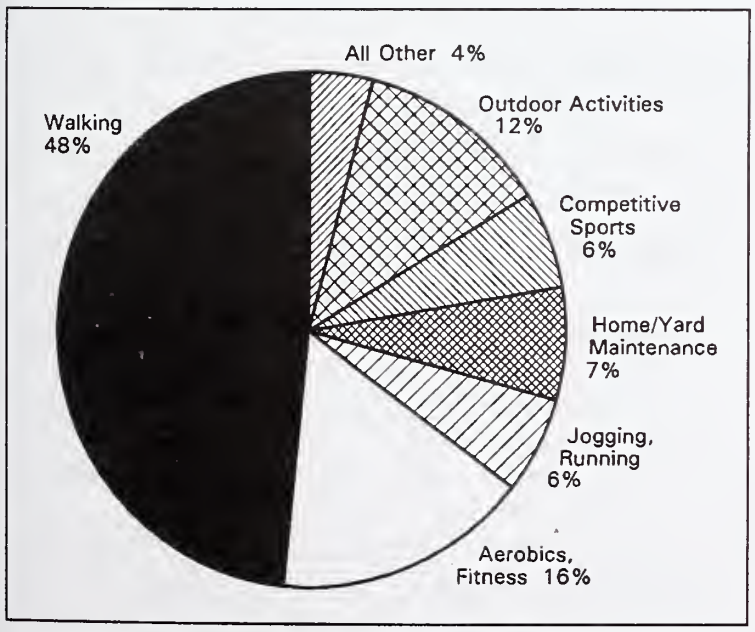

Figure 1. Most frequent type of leisure-time physical activity for adults who engage in any exercise, Rhode Island, 1992 and 1994 (combined).

Table 1. Most frequent type of leisure-time physical activity for adults who engage in any exercise, by level of physical activity, Rhode Island, 1992 and 1994 (combined).

	Level of Physical Activity		
Type of Activity	Sustained	Moderate	Irregular
Walking	42%	46%	48%
Aerobics, fitness	20	19	12
Jogging, running	8	9	4
Home/yard maintenance	8	5	9
Competitive sports	6	6	9
Outdoor activities	12	11	14
All other activities	4	5	5

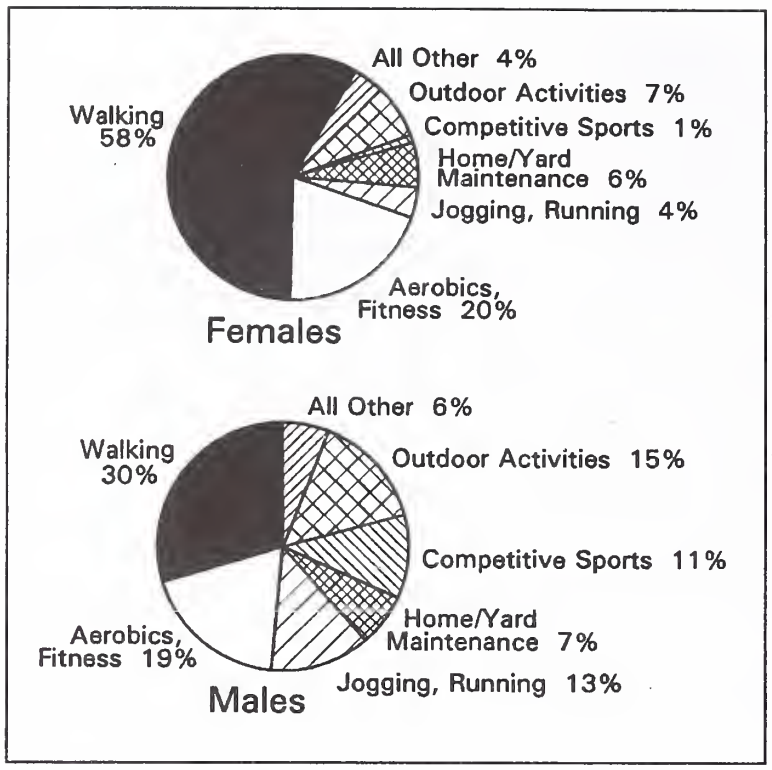

Figure 2. Most frequent type of leisure-time physical activity for adults who engage in sustained or moderate exercise, by gender, Rhode Island, 1992 and 1994 (combined).

Results

Respondents who exercise were by far most likely to report walking (48%) as their most frequent type of physical activity, followed by aerobics or fitness activities (16%) and outdoor activities such as hiking, bicycling, swimming, and golf (12%). (Figure 1) More strenuous activities such as jogging or running, or competitive sports such as basketball, tennis, racquetball, and soccer, were reported less often.

Table 1 compares the most frequent type of physical activities engaged in by respondents with different levels of physical activity. Walking is reported as the most frequent type of activity by all three groups, ranging from 42% for sustained exercisers to 48% for irregular exercisers. Aerobics or fitness activities and jogging or running were more often reported by sustained and moderate exercisers than by irregular exercisers; otherwise, the types of activities engaged in vary little among the three groups. However, there were substantial differences in the proportions of exercisers at each level who participate in more than one type of physical activity. Many more sustained and moderate exercisers (69% and 55%, respectively) reported a second type of activity than did irregular exercisers (28%).

Among all regular exercisers (sustained and moderate combined), 61% of those ages 55 and older reported walking as their primary activity, compared with 45% of those ages 35-54 and 33% of those ages 18-34. Although walking was the activity mentioned most often by younger adults, they had higher percentages than older adults for aerobics or fitness activities, competitive sports, and jogging or running. (Table 2)

Table 2. Most frequent type of leisure-time physical activity for adults who engage in sustained or moderate exercise, by age, Rhode Island, 1992 and 1994 (combined).

	Age Group		
Type of Activity	18-34 Years	35-54 Years	55 Years and Over
Walking	33%	45%	61%
Aerobics, fitness	26	17	10
Jogging, running	12	11	1
Home/yard maintenance	2	8	11
Competitive sports	10	4	2
Outdoor activities	11	11	11
All other activities	6	4	4

Women who exercise regularly were nearly twice as likely as men to name walking as their primary activity (58% vs 30%), while men were much more likely than women to mention outdoor activities (15% vs 7%), competitive sports (11% vs 1%), or jogging or running (13% vs 4%). (Figure 2)

Discussion

Americans and Rhode Islanders have made substantial progress in changing their behavior to reduce health risk in the areas of cigarette smoking, cancer screening, and safety belt use, but have not made corresponding progress in increasing their levels of physical activity.[3] Identifying the types of physical activities preferred by those who have successfully adopted patterns of regular exercise, as well as preferences by age group and gender, can be useful in the development of public health interventions to improve participation in exercise among all segments of our population.

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References

1. Department of Health and Human Services, Public Health Service. *Physical Activity and Health. A Report of the Surgeon General.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
2. Hesser JE, Kim H. Levels of physical activity among Rhode Island Adults. *Medicine & Health RI* 1997; 80(9).
3. Casey DB, Hesser JE, Buechner JS. *Health Risk Behaviors Among Rhode Island Adults 1990-1994.* Providence, RI: Rhode Island Department of Health, Office of Health Statistics, 1996.

Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	March 1997	12 Months Ending with March 1997	
	Number	Number	Rates
Live Births	1,131	13,531	13.7*
Deaths	880	9,999	10.1*
Infant Deaths	(12)	(92)	6.8#
Neonatal deaths	(9)	(74)	5.5#
Marriages	549	8,229	8.3*
Divorces	260	3,206	3.2*
Induced Terminations	508	5,583	412.6#
Spontaneous Fetal Deaths	113	1,032	76.3#
Under 20 weeks gestation	(106)	(949)	70.1#
20+ weeks gestation	(7)	(83)	6.1#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	September 1996	12 Months Ending with September 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	240	3,180	321.1	4,283.0
Malignant Neoplasms	200	2,558	258.3	7,101.5
Cerebrovascular Diseases	40	584	59.0	834.0
Injuries (Accident/Suicide/Homicide)	27	336	33.9	5,931.5**
COPD	31	372	37.6	242.5

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

A Pair of Paradoxical Stamps from Ecuador

Ecuador, a republic of some 11,500,000 persons, occupies 107,000 square miles in the northwestern portion of South America. On August 1, 1930, in honor of the centenary of the founding of the nation, the government of Ecuador issued a set of thirteen postage stamps to promote the country's agricultural products and scenic views [Ecuador, 1930, 304-16]. The farms of Ecuador produce bananas, cocoa, coffee, sugar cane [the nation's currency unit, the *sucre*, is named for this resource], manioc, plantain and tobacco.

One of the stamps in the set Educador 33-7 depicts a tobacco field in full bloom [Figure 1, *El Ecuador Produce Tabaco*]. It may be assumed that the stamp was designed and produced to promote the growth and sales of tobacco and tobacco products.

The stamp was not a best seller. And since large inventories remained in 1938, the government reissued #307 as RA43. In its new life, the stamp was changed to a Postal Tax Stamp. An additional 5 centavo tax was added, and the phrase, *"Campana Contra El Cancer"* [Campaign against Cancer] had been overprinted on the stamp (Figure 2). To hasten the reduction of the inventory, RA43 was mandated for all mail from November 23 to November 30, 1938. The tax revenues were donated to the *International Union for the Control of Cancer.*

It is not known whether the Ecuadoran postal authorities, some 67 years ago, appreciated the irony of an anti-cancer message imprinted upon a stamp advocating the use of tobacco.

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NUMBER 1

PROVIDENCE, R.I., JANUARY, 1917

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Ninety Years Ago

[September, 1907]

The lead editorial summarizes a speech given by Dr. Charles V. Chapin. The talk, at Brown University, discussed recent viewpoints in sanitary science and emphasized three newer concepts in the field of bacteriology which had evolved in the preceding fifteen years. The first observation is that contagious diseases are largely parasitic in nature, caused by minute organisms such as protozoa or bacteria; the second is that these pathogens rarely are capable of survival outside of the host and therefore physical contact is needed to transmit them effectively from one host to another; and third, the revolutionary thought that parasitic invasion of the body may not always cause fully developed disease but may instead create what Chapin calls "the carrier state." The author concludes by observing that preventive measures by public health sanitarians have not as yet adjusted to this newer knowledge, but such adjustment is inevitable.

Another editorial describes various efforts to aid the chronically ill children of the Providence region. The Crawford Allen farm is mentioned as a place where 35 children may recuperate while enjoying the advantages of fresh air and the neighboring salt water. The Tower Hill Farm is yet another place for convalescent and feeble children each allowed a week's outing. And the Alfred Stone estate provides a camp for about ten children with chronic tuberculosis.

W.B.Cutts, MD, describes the early history of roentgen ray therapy from its first use in 1896 in Vienna as a means of ablating a large hairy nevus on the skin of a child. The author first discusses the critical importance of dosage which is determined by the distance from the tube to the body, the duration of radiation, and the quality of radiation. Quantitation, he notes, while essential, is still difficult to determine. He then emphasizes the need to screen all parts of the patient not to be irradiated. He stresses, too, the need to protect the operator. In addition to a variety of skin ailments such as acne, tinea and lupus, Dr. Cutts lists those neoplasms which are responsive to radiation, particularly the superficial epitheliomata. He summarizes his experiences as follows: "The Roentgen ray, as a therapeutic agent, is not a panacea nor a miracle worker, but in the hands of competent, properly trained, experienced operators, it is, for certain well defined diseases and conditions, one of the most valuable therapeutic agents in the possession of the medical profession."

Dr. A.B.Judson discusses the prevention of deformity, after infantile paralysis, by recumbency during the stage of recession. In essence, the author claims that keeping the child in a prone position - for up to eighteen months - will lessen the usual deformity of the paralyzed legs. Passive movement and massage should be continued, in his judgment.

The frequency of and therapy for the undescended testis is discussed by John W. Keefe, MD. Many of the relevant issues in the care of these patients are illustrated in the brief synopses of six of his cases.

Arthur Hollingworth, MD, discusses the surgical treatment of *fistula in ano*. He briefly describes the procedure [particularly as it pertains to the sphincter muscles] and the post-operative care, stressing the need for total bed rest for up to two weeks. He notes, too, that the patient should be forewarned of the possibility of fecal incontinence following operation.

Fifty Years Ago

[September, 1947]

The problem drinker is the subject of the lead article by Charles Durfee, PhD. He defines a problem drinker as one whose life, overshadowed by drink, has been threatened or destroyed. The author lists eight symptoms the appearance of any denoting the seriousness of the situation: Blackouts and major lapses of memory; extracurricular drinking; an unwillingness to talk about liquor as a major problem; rationalization of the problem; unwillingness to attend dinners or functions where liquor is not served; change in the intensity and character of the hangovers, now associated with fatigue, muscle cramps, vomiting, gastric distress and tremors; gastrointestinal disorders of a chronic nature including vitamin deficiency manifestations; insomnia and irritability. He concludes: A problem drinker can never drink again, even in moderation.

Francis M. Rackemann, MD, asks whether asthma is a symptom or a disease. He concludes that it is probably both, recognizing that the clinical presentation of asthma can derive from a variety of causes. He expresses some skepticism that allergies play a significant etiologic role but admits that the problem is far from being solved.

Malford W. Thewlis, MD, summarizes the importance of social work in the care and treatment of the elderly. He stresses the importance of undertaking preventive measures at the earliest possible moment.

F. Ronchese, MD, presents a case of staphylococcal impetigo in a 15 year old school boy, treated successfully by penicillin dressings and roentgen therapy.

Twenty Five Years Ago

[September, 1972]

Ruby laser photocoagulation in the treatment of diabetic retinopathy is discussed by Arthur I. Geltzer, MD. He notes, first, that diabetic retinopathy is rapidly becoming the leading cause of blindness in the United States; by the year 2000, he estimates that there will be about 550,000 blind diabetics in this nation. The author details the history of photocoagulation as a therapeutic modality and summarizes his experiences in twenty five cases, many illustrated by retinographs. He concludes that this form of treatment causes no morbidity, the only rare complication being bleeding. In the treated cases, following one year followup, there was no new vitreous bleeding, no deterioration in the degree of neovascularization and some improvement in vision.

Robert C. Clyman, a senior at Brown University, makes a plea for further research in the use of LSD in psychotherapy. He contends that a use may be found for this agent in psychiatric categories less severe than schizophrenia.

Seebert J. Goldowsky, MD, editor of the *Journal*, provides the readership with a brief 1772 letter from Solomon Drowne to his brother describing the burning of the armed schooner, Gaspee. Drowne was then a student at Brown and received his MD degree from the University of Pennsylvania; following which he served as a surgeon in the Revolutionary Army. In 1811 he was appointed as Professor of Materia Medica and Botany at Brown. He died in 1834.

An editorial mentions that the Corporation and faculty of Brown University, by separate votes, expressed support for the development of a comprehensive program in medical education.

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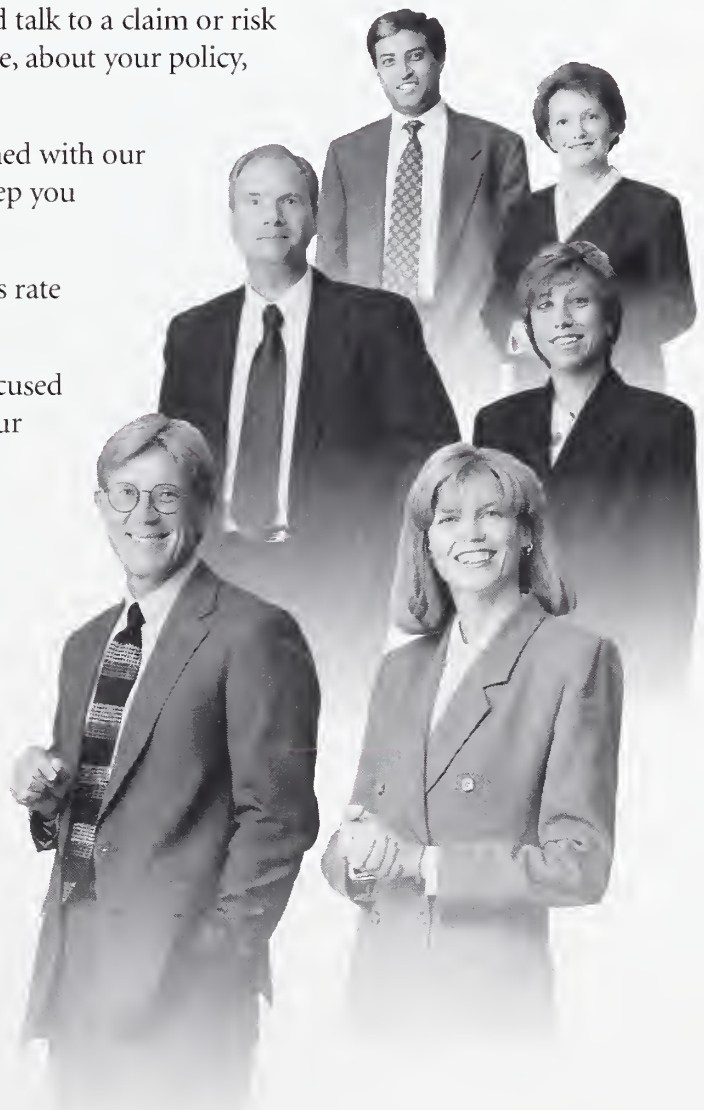

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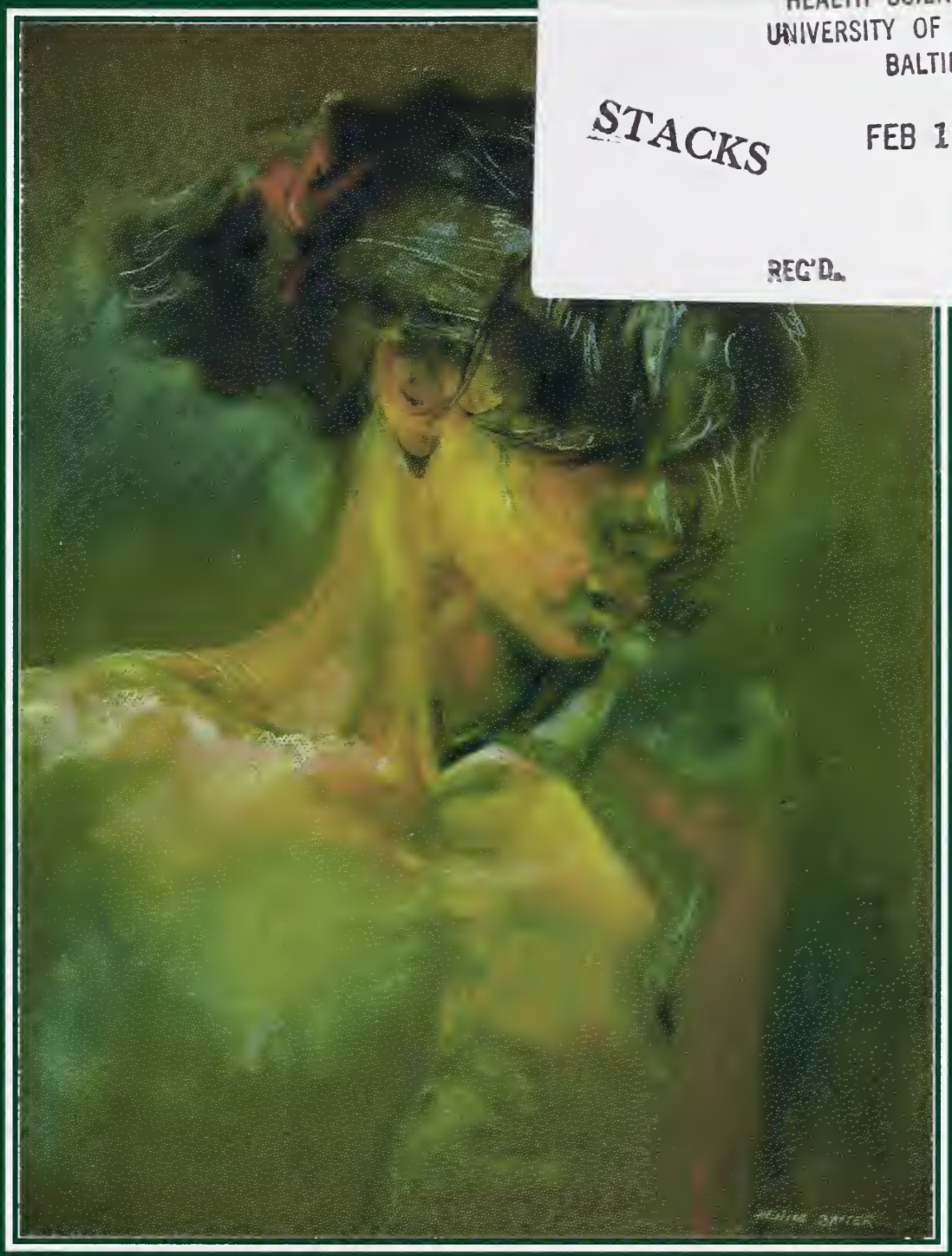

Sexually Transmitted Disease in Rhode Island

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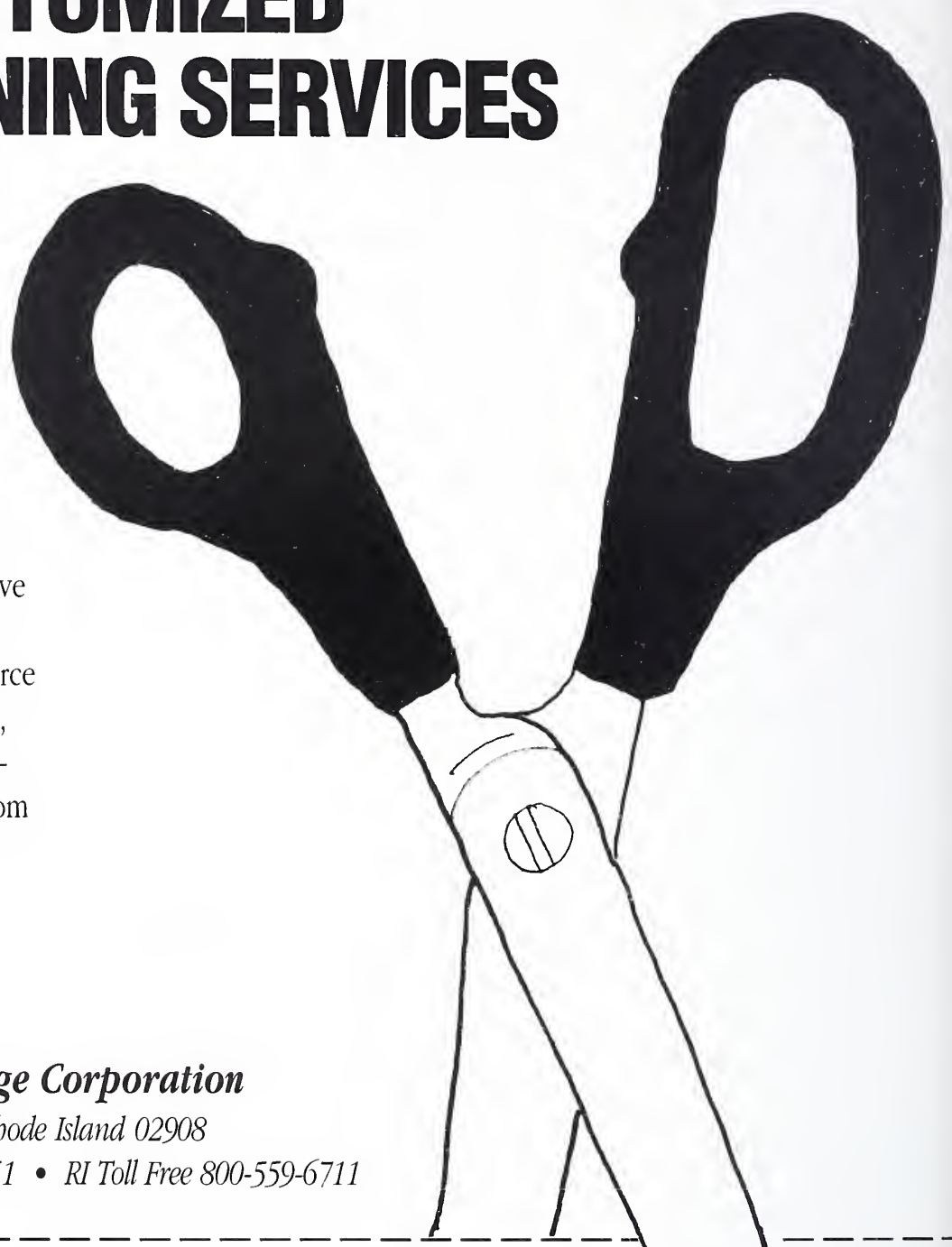

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COMMENTARIES

Sexually Transmitted Diseases in Rhode Island: A Panoply of Familiar as Well as Previously Unrecognized Challenges

The emergence of the HIV/AIDS epidemic and the increased awareness of serious chronic pathogens such as human papilloma virus and chlamydia, as well as the persistence of bacterial sexually transmitted diseases (STDs) such as gonorrhea, remind us that despite our increasingly sophisticated diagnostic and therapeutic armamentarium, effective STD control remains a complex, fragile, often transient process. In 1996, the Centers for Disease Control and Prevention (CDC) logged 34,101 cases of AIDS, 200,808 cases of chlamydia, and 148,474 of gonorrhea. So, despite the advent of sophisticated molecular diagnostic technologies such as polymerase chain reaction (PCR) and highly effective antibacterial treatments, efficient STD control of well known pathogens continues to be elusive.

The dynamics that potentiate the spread of any sexually transmitted disease are both simple and complicated. In order to be disseminated, the etiologic agent must live long enough to be transmitted to at least one other uninfected person before it is treated, becomes avirulent, is locally contained, or kills the host. However, the dynamics that amplify STD spread are often rooted in sociocultural issues, such as the existence of local core groups - i.e. individuals who have multiple sexual partners and engage in the high risk activities that potentiate the spread of specific pathogens.

The greater the social mobility, the more the spread of sexually transmitted diseases across prevalence gradients.

Each STD has unique features related to the organism's cycle and communicability. The way in which core groups potentiate epidemics may vary by the specific pathogen and outbreak. For example, the CDC found that commercial sex workers in Newark, New Jersey, had a very high HIV prevalence in the early 1980s; at the same time the virus was virtually undetected among similar Las Vegas cohorts. The reason? Newark workers frequently engaged in injection drug use, and careful employment regulations removed drug-addicted sex workers in Nevada. In other words, for an STD to spread, a critical mass of people needs to be engaging in activities that potentiate the spread of that specific pathogen; and the highest risk persons also need to be in contact with a sufficient number of lower risk individuals so that the epidemic becomes amplified in the larger population.

Social mixing patterns may explain why a specific STD epidemic may spread more rapidly in one community than in another. The greater the social mobility, the more rapid the spread of STDs across prevalence gradients. Certain STDs may be more prevalent in one area than in another. To understand patterns of spread, one needs to remember Tip O'Neil's dictum, "All politics are local." In this case, epidemics spread because of community-based factors that amplify the unique biological features of each pathogen in the context of a distinctive social milieu.

This special issue on "Sexually Transmitted Diseases in Rhode Island" addresses the complex biosocial matrix of STDs. Colleagues from the Rhode Island Department of Health provide the epidemiologic context for understanding the prevalence and incidence of the commonly reported local STDs. Drs. Zinner and McCormack provide a historical perspective on their collaboration, in which they have surveyed sequential cohorts of local undergraduates for STDs. The clinical diagnosis and management of pelvic inflammatory disease, described by Drs. Peipert and Phipps, has been greatly enhanced by the recognition of the prominent role of chlamydia and the utilization of newer pelvic imaging studies such as ultrasonography and CT scan, resulting in decreased morbidity. Conversely, improvement in the diagnosis of human papillomavirus disease, described by Dr. Braun and Ms. Hall, has not yet resulted in comparable changes in the prevention of the attendant morbidity that had been described as

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
CDC	Centers for Disease Control and Prevention
CT	Computerized tomography
HIV	Human immunodeficiency virus
HPV	Human papilloma virus
PCR	Polymerase chain reaction
STD	Sexually transmitted disease

the sequelae of infection with these oncogenic viruses. Clinicians can avert the most dire consequences, cervical neoplasia, through careful gynecological follow-up of HPV-infected women and counseling safer sex for uninfected women. Specific therapeutic options for advanced HPV-induced cervical disease are still undergoing intensive clinical trials.

The ultimate contemporary illustration of the interface between virology, immunology, and psychosocial factors related to STDs, is the HIV/AIDS epidemic, summarized by Drs. Cu-Uvin and Flanigan. In Rhode Island, in the late 1970's and early 1980's, proximity to New York City and a sufficiently large core group of injection drug users, created the type of core group dynamics that potentiated this subsequent secondary spread to women, increasingly manifesting in the late 1980's and 1990's. Drs. Pugatch, Rich, and Flanigan describe the concomitant spread of the HIV epidemic along local adolescents.

The IOM recently recognized the seriousness of the 12 million new cases of STDs reported in the United States, by assembling an expert panel that issued a major report, *The Hidden Epidemic: Confronting Sexually Transmitted Diseases* (Thomas R. Ing & William T. Butler, editors, National Academy Press, Washington, DC 1997). In its 432 pages, this monograph delineates why, despite the affluence and the chemotherapeutic means to prevent and treat many STDs, 5 of the 10 most commonly reported diseases in 1995 in the United States were STDs. The report concludes with the following call to action: "To successfully prevent STDs, many stake holders need to redefine their mission, refocus their efforts, modify how they deliver services and accept new responsibilities. In this process, strong leadership, innovative thinking, partnerships, and adequate resources will be required.... The process of preventing STDs must be a collaborative one. No one agency, organization, or sector can effectively do it alone; all members of the community must do their part. A successful national initiative to confront and prevent STDs requires wide spread public awareness and participation in bold national leadership from the highest levels."

We hope that this issue of *Health & Medicine/Rhode Island* raises awareness in the medical community, so that we all may be prepared to assist in confronting the challenges.

– Kenneth H. Mayer, MD

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The Salvation Army and Phossy Jaw

Wretched tenements, widespread filth, rampant disease, alcoholism and human despair characterized the east London of 1865. William Booth launched a community-based evangelical and charitable program in an attempt to lessen the moral and physical poverty of these slums. His missionary gatherings, frequently to the accompaniment of martial music,

were conducted in tents, thus avoiding the intimidating ambience of formal houses of worship. In doctrine, Booth's ministry emphasized direct preaching, the primacy of sin and redemption and the merit of self-sacrifice for the salvation of others. By 1878 his mission had expanded to other communities and the decentralized sect was supplanted by a quasi-military structure to meet the need for "organized warfare against social evils." Booth was now earnestly recruiting an army for purposes of salvation.

From its beginnings, the Salvation Army recognized that an evangelical outreach would be ineffective unless certain environmental and occupational menaces could be overcome. One of these was rampant alcoholism; and another was a disfiguring, destructive disease called phossy-jaw, which was then endemic amongst the women and children employed in the factories manufacturing matches. In a bold move to counteract this pervasive occupational disease, Booth invested his financial resources in the building of a model match factory using industrial processes not injurious to the health of the workers. By creating a safer workplace, the Salvation Army sought to motivate other match factories, by persuasion or shame, to improve their working conditions while concurrently hastening the day when Parliament would establish legislative safeguards for the match industry.

Friction matches, invented in 1826, were called lucifers [Latin, bearing light] and potassium chlorate was the igniting agent. By 1832, the lucifers

had been supplanted by match tips covered with yellow phosphorus, creating a more efficient and cheaper match but one that carried two palpable dangers: first, since moderate heat caused them to combust spontaneously they constituted a major fire hazard; and second, there emerged a widespread and seriously disabling disease of the mandible amongst factory workers chronically exposed to the yellow phosphorus. Phosphorus toxicity was known on the street as "fossy jaw."

The disorder typically began as an isolated toothache, often in a tooth with prior caries. This progressed to abscess formation, necrosis of bone and sequestration of necrotic fragments through one or more sinus tracts. Within months this led to a major disfigurement of the jaw accompanied, at times, by malnutrition and general sepsis.

By 1850, phossy jaw was endemic to all European match factories. Within a decade, though, a Swedish factory had finally devised a safety match which could only be ignited when struck upon a phosphorus-impregnated abrasive surface. Furthermore, the dangers to the workers were obviated since a non-toxic red phosphorus was now substituted for the yellow phosphorus. The safety matches were slightly more expensive to produce and hence the older plants continued to yield both yellow phosphorus matches and invalids with phossy jaw.

On repeated occasions the dismaying statistics on phossy jaw were presented to Parliamentary committees but to not avail. Even the sight of victims with virtually destroyed jaws elicited little desire for action - until the conference room was darkened and the legislators could then behold the eerie green emanations from the stricken jaws of those afflicted. In later years, many said that it was this spectral phosphorescence that finally convinced them to enact remedial legislation.

Most efforts to curtail the international use of yellow phosphorus were ineffectual until the International Association of Labor Legislation began its work in Basel, Switzerland, in 1900. The first item on its agenda was the abolition of yellow phosphorus match production. The Berne Convention of 1906, with most European countries as signatories, finally banned the use of yellow phosphorus in match production. In 1912, the United States passed the Hughes-Esch Act, which placed prohibitive taxes upon yellow phosphorus matches thus effectively banning their production in the States.

Phosphorus [Greek, bearer of light] was the name that the Romans bestowed upon the morning star. The nonmetallic element bearing this name was not isolated until 1669 when a German alchemist [described by his colleagues as an "uncouth physician who knew not a word of Latin"] vowed to extract gold from urine evaporated to dryness; and in the process he discovered a substance within the residue which glowed in the dark. A few years later the English chemist Boyle extracted elemental phosphorus from animal bone and noted its combustibility when exposed to air. During the next century chemists segregated two forms of phosphorus: yellow [sometimes called white], and red, each with somewhat different physical properties.

Phosphorus lay dormant on the chemist's shelf until its utility in matches, fireworks and explosives was established. The use of phosphates as agricultural fertilizer, in the form of bone meal, had been known since antiquity but it required an industrial modification to a more soluble superphosphate before it could be offered as a more efficient soil additive.

The specter of phosphorus toxicity reappeared when further industrial applications of phosphorus were discovered in the 20th century. When added to gasoline, tri-ortho-cresyl phosphate [TCP] was found to increase the efficiency of combustion engines; and when added to machine oil, it augmented its lubricating abilities even under excessive temperatures. In 1940, a unit of the Swiss army accidentally used TCP-enhanced machine oil for the cooking of cheese fritters. About 80 soldiers in the unit developed a serious, and often irreversible, peripheral neuromuscular disorder. In 1959 a number of unscrupulous food dealers in Morocco purchased drums of machine oil and sold them as cooking oil. Over 10,000 Moroccans developed a flaccid paralysis, many dying.* After a brief trial, the guilty were beheaded. Shortly after World War II certain organic phosphates, such as parathion, were shown to be effective insecticides. This agent, operating as an enzyme inhibitor, was also toxic to birds and these compounds have now come under increasing legislative control. Organic phosphates also form the basis for numerous herbicides, rat poisons, fungicides and detergents, each carrying certain risks to the environment.

Phosphorus is an element essential to life, comprising over half of the bone-mass and teeth, a component of certain B vitamins, part of the complex structure of myelin and a necessary element in the nucleic acids. But in contrast to its physiologic counterparts, calcium and magnesium, industrial applications of phosphorus have created much human misery. It took a soul-saving Salvation Army to call attention to these harmful effects.

– Stanley M. Aronson, MD

* See "Philately in Medicine," this issue.

Sexually Transmitted Diseases: The Hidden Epidemic

In December 1996, the Institute of Medicine (IOM) issued a report, *The Hidden Epidemic*, culminating the work of a 15 member committee on prevention and control of sexually transmitted diseases (STDs). The report includes:

1. the factors that contribute to the hidden epidemic of STDs;
2. the effectiveness of current public health strategies and programs to prevent and control STDs; and
3. the direction for future public health programs, policy, and research in STD prevention and control. More than 25 infectious organisms are transmitted principally through sexual activity. Many are easily treatable, hence the need for early detection and treatment.

Yet, as *The Hidden Epidemic* describes, the current medical and social environment makes early detection and treatment difficult. In Rhode Island, our state-funded "Specialty Clinic" has the capacity to diagnose and treat early. Our efforts in the clinic are devoted to the treatment of three STDs: chlamydia, syphilis and gonorrhea. The clinic can provide the critical entry into treatment and make public health work possible in this context if service is available, accessible and of high quality. As the IOM report highlights, there is much more to STD prevention and control than the clinical component. That is our challenge.

As you read this issue of *Medicine & Health/Rhode Island,* consider the implications for Rhode Island of significantly redefining our prevention and control strategies. To provide an appropriate public health response, both in Rhode Island and nationally, the report suggests that we alter the way we perceive the STD epidemic and establish a national "system" for prevention. The committee recommends four major strategies for policy makers:

1. Overcome barriers to adoption of healthy sexual behaviors by open discussion, media advocacy and behavioral research.
2. Develop strong leadership, strengthen investment, and improve information systems for STD prevention by involving public and private health professionals and organizations.
3. Design and implement essential STD-related services in innovative ways for adolescent and underserved populations by shifting the focus to prevention and using non-traditional venues to reach the hard-to-reach.
4. Ensure access to, and quality of, essential clinical services for STDs by assessing access and quality and giving feedback to insurers, health professionals and educators.

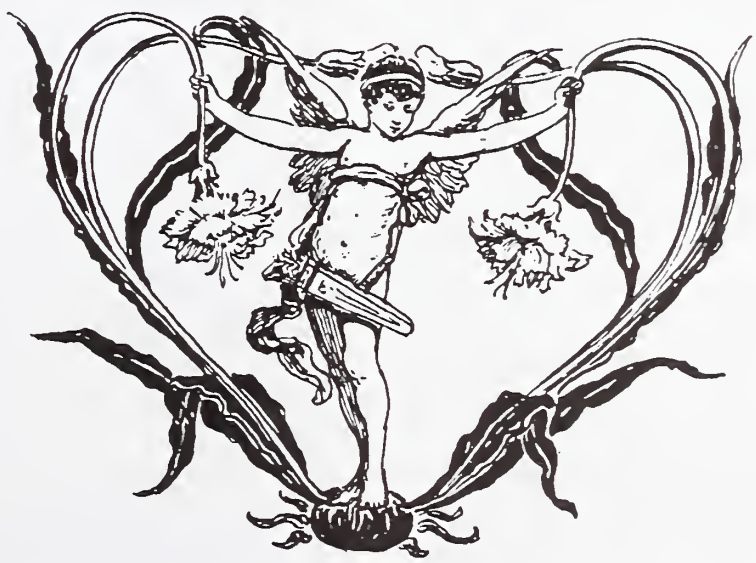
The IOM report describes the major impact STDs have had on health: five of the ten most frequently reported diseases in the U.S. are STDs. Primary prevention of STDs is essential, and that requires change in sexual practices as well as health care. In Rhode Island, 1996 data reveal that of all chlamydia cases, 36.4% were among the age category 10-19 years old, and 44.9% of all cases were in the age group 20-29 years old. This information alone suggests the absolute necessity for the adoption of healthy and safe sexual behaviors at the initiation of sexual activity. The epidemic of sexually transmitted disease does not go away because we in health care do not talk about it.

I am encouraged by efforts underway in Rhode Island. For two years, Rhode Island has had a full time staff person working towards the difficult task of reaching out to disenfranchised youth and communities of color. This work is integrated into the efforts of STD and HIV primary prevention, focused on high-risk adolescents through the juvenile justice system, street outreach, and community-based organizations. We have invested in providing up-to-date clinical information to practitioners through teleconferencing. We invested resources to assure state-of-the-art laboratory analysis of STDs.

There is much to be done if we are to significantly improve the situation, reducing STDs and their aftermath. The information in this issue of *Medicine & Health/Rhode Island* is intended to stimulate your interest and your participation in ending this hidden epidemic.

– Patricia A. Nolan, MD, MPH

Patricia Nolan, MD, MPH, is Director, Rhode Island Department of Health.



Sexually Transmitted Diseases in Rhode Island: Past, Present, and Future

Paul G. Loberti, Jr., MPH, and Utpala Bandy, MD, MPH

"The process of preventing STDs (sexually transmitted diseases) must be a collaborative one. No one agency, organization, or sector can effectively do it alone; all members of the community must do their part. A successful national initiative to confront and prevent STDs requires widespread public awareness and participation and bold national leadership from the highest levels." (Institute of Medicine. *The Hidden Epidemic,* Confronting Sexually Transmitted Diseases, Report, 1997)

STD intervention has been a direct service of the Rhode Island Department of Health for the past 88 years. Although times have changed, STDs continue to merit state intervention.

Framing the historical significance of STD prevention and treatment in Rhode Island, as well as illustrating the provision of services offered currently, are important starting places. Currently, the Whitmarsh Specialty Clinic, located at St. Joseph Hospital, Providence, is the only state-funded STD facility in Rhode Island.

As this discussion takes you through an historical perspective of STDs in Rhode Island, keep in mind that the Rhode Island Department of Health funds its STD prevention and treatment programs using a combination of federal and state monies. Since federal funds are received from the Centers for Disease Control and Prevention (CDC), we must adhere to strict guidelines and protocols for prevention activities and treatment services. Treatment and clinical services and guidelines are provided by the MMWR protocol set forth by the CDC. CDC also highlighted some key areas in their 1995 Strategic Plan for the Division of STD Prevention.[1]

Listed as goals, core function areas, and strategic issues, they comprise:

- Prevent STD-related PID, infertility, and ectopic pregnancy
- Prevent STD-related HIV Transmission
- Prevent STD-caused adverse outcomes of pregnancy
- Prevent other viral STDs and their complications

Abbreviations Used:

CDC	Centers for Disease Control and Prevention
HIV	Human immunodeficency virus
MMWR	Morbidity and Mortality Weekly Reports
PID	Pelvic inflammatory disease
RICPG	Rhode Island Community Planning Group

Presently the Rhode Island Department of Health is also the recipient of a supplemental grant to address the issues of STD-related PID and infertility, and progress is being made to address many of the aforementioned strategic issues.

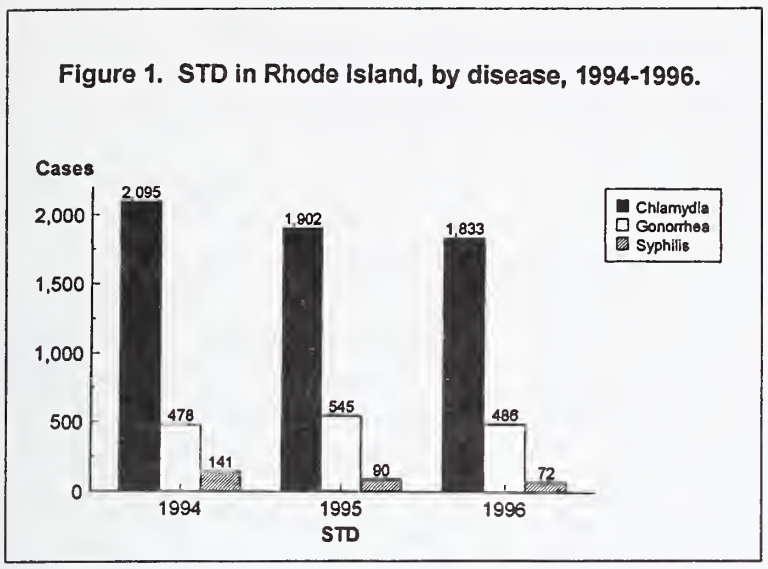
The clear and concise message from CDC to states has been to use "science to direct programs." The science is the epidemiology of the disease; it must undergird our efforts. To put these issues into a useful context, it is important to understand past trends and efforts.

Our Past

Public interest in venereal disease heightened in 1918 when the War and Navy Departments noted the large numbers of infected soldiers and recruits judged unfit for service. The Public Health Service began a preventive campaign, urging State Boards of Health to make venereal disease reportable and quarantinable, and to commence programs on public education. This heightened awareness spurred Congress to pass the Chamberlain-Kahn Act, providing the first public health grants to assist states in implementing programs. This Act also spurred the Rhode Island Board of Health to establish a Division of Venereal Disease, in 1918, with a grant for $6,000.

In 1919 Rhode Island had the highest rate of reported venereal disease of any New England state. This statistic did not alarm state legislators: shortly after the first year of the grant, the General Assembly reneged on its commitment. Creative financing by public health officials salvaged the programs by combining funds from the Governor's War Emergency Fund with the Board of Health's own budget. Soon after, funds for this initiative were stabilized and the Board began aggressively to promote preventive STD messages. The Army issued pamphlets entitled "Keeping Fit to Fight," which the Board distributed. In addition, six treatment centers were established - - three in Providence, one each in Pawtucket, Newport and Woonsocket. Free medications were made available by the Public Health Services branch of the federal government. Prevention efforts were comprehensive, with a community focus. For instance, the Board of Health asked clergymen to preach "compelling sermons" on special "Health Sundays." Warnings about venereal disease were posted in toilets in railroad stations, public comfort stations and bath houses.

The contemporary face of STD prevention and treatment in Rhode Island is much different. Significant medical advances since the advent of penicillin revolutionized the treatment of STDs. However, even with these advances, STDs have a substantial presence in our society, and disproportionately affect communities of color and adolescents.



Our Present

To understand the elements associated with STD prevention and treatment in the state, we must examine the "what, who, where and how" of the provision of services. Although we cannot provide an exhaustive list of services, we can identify major ones.

The State Funded STD Clinic

The Whitmarsh Clinic, operated by the Rhode Island Department of Health, is the only state-funded STD clinic. This clinic is free to the public and offers a variety of confidential services including screening, evaluation, diagnosis and treatment. Over 4,000 clients were seen in 1996. Follow up is done, as well as partner notification and contact tracing/tracking of clients. All clients seen in the clinic are counseled as to the prevention of STDs; condoms are distributed. A separate infertility grant is associated with, but not directly related to, the clinic.

There is a disproportionate burden of sexually transmitted disease in the African-American and Hispanic population.

Table 1. Characteristics of STD cases in Rhode Island, 1994-1996.

	1994	1995	1996
GENDER			
Male	668 (24.3)*	652 (25.4)	518 (21.7)
Female	2078 (75.7)	1913 (74.6)	1873 (78.3)
AGE			
<10	22 (0.8)	9 (0.3)	7 (0.3)
10 - 19	946 (34.5)	876 (34.2)	871 (36.4)
20 - 29	1294 (47.1)	1211 (47.2)	1073 (44.9)
30 - 39	346 (12.6)	324 (12.7)	321 (13.4)
40 - 54	117 (4.3)	121 (4.7)	101 (4.2)
55 +	21 (0.8)	25 (1.0)	18 (0.8)
RACE**			
White	1254 (46.7)	1086 (42.9)	983 (41.6)
African American	806 (30.0)	808 (31.9)	722 (30.6)
Hispanic	568 (21.1)	571 (22.6)	578 (24.5)
Asian	55 (2.0)	56 (2.2)	71 (3.0)
Native American	5 (0.2)	9 (0.4)	8 (0.3)
TOTAL	**2746**	**2566**	**2391**

Note:* Numbers in parentheses are percentages.
** Race information is missing for 58 cases in 1994, 36 cases in 1995 and 29 cases in 1996.

The STD program is funded by both state and federal funds. Dr. Charles McDonald has acted as medical consultant to the clinic for the past 20 years. He supervises resident staff that rotate through the clinic each quarter. This rotation provides the clinic with high quality care as well as a visible teaching environment. A significant number of dermatologists in Rhode Island have gained experience through this rotation.

The STD program in Rhode Island is integrated with the HIV/AIDS program, with shared resources. The mission statement for the Rhode Island Department of Health's STD Program is: "To prevent (including HIV) and treat sexually transmitted diseases; with particular emphasis on chlamydia trachomatis, syphilis (primary, secondary, early latency, and congenital stages), and gonorrhea. **Free confidential testing, diagnosis and treatment will be offered in the state clinic in a professional, caring and compassionate manner.**"

Other STD Services in Rhode Island

Other major facilities for STD diagnosis and treatment in Rhode Island include hospitals, private physicians, neighborhood health centers, group health centers, and university health centers. Hospital outpatient departments have the most volume of patients, followed by neighborhood health centers and then private physicians. The state-funded clinic sees approximately 20% of all STD morbidity in Rhode Island, compared to the other STD providers.

Present Trends

Since 1994, chlamydia has been the most widely reported STD in Rhode Island, followed by gonorrhea and syphilis. Trends have indicated a decrease in incidence in all three reportable STDs in Rhode Island with a marked decrease in syphilis since 1994 (See Figure 1).

In 1996, there were 518 cases of STDs among males, 1873 cases among females. While most cases appear in white females, there is a disproportion-

ate burden of disease in the African-American and Hispanic population. Of particular concern is the age distribution of STDs in Rhode Island. A disproportionate rate of infection exists among adolescents and young adults: over 80% of all STDS are reported in the age group 10 - 29 years old. (Table 1)

Our Future

In the CDC document, "Innovations in STD Prevention: Lessons from the STD Accelerated Prevention Campaign Enhanced Projects," several projects were highlighted to encourage states to develop and evaluate innovative approaches to STD prevention. In addition, the document focused on promoting an increased commitment of local resources - both public and private - toward STD prevention efforts. Among the projects discussed were 1) screening adolescents for chlamydial infection in school-based health clinics and juvenile detention centers, and 2) STD/HIV prevention and intervention in rural and minority populations. Based on disease trends for STDs in Rhode Island these areas are of much concern to our prevention and treatment efforts.

In light of the IOM's report, Rhode Island must assume an agressive posture to combat the national epidemic of STDs. The data indicate the need for continued primary prevention activities with active outreach programs for youth across the state. In addition, accessible services for youth must exist statewide - this is where necessary public health partnerships are essential. Other targets include men who have sex with men, women, communities of color, sex industry workers and injecting drug users.

In Rhode Island, the future of STD prevention and treatment will be determined by our ability to create a collaborative community response to the challenges set forth by the IOM. Encouraging work is being done by the HIV Prevention Community Planning Group (RICPG), where a committee of community partners has begun to review and analyze STD data in Rhode Island and plot needs and priorities for high-risk populations. The RICPG has incorporated STD data in each of the HIV Prevention Comprehensive Plans written since 1993. This approach has heightened the public's awareness of STD trends in the state as well as raised awareness of the importance of an integrated approach to STD and HIV education. Such efforts will continue and the Department of Health will be proactive in bringing partners together to discuss these issues. within existing community partnerships. Most importantly, we need providers to assist us in analyzing the needs, priorities, distribution of disease trends and evaluation of these most critical challenges.

References

1. Centers for Disease Control and prevention, STD Division. Strategic Plan for the Division of STD Prevention. 1995.

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Pelvic Inflammatory Disease in Rhode Island: Epidemiology, Diagnosis and Therapy

Jeffrey F. Peipert, MD, MPH, and Maureen Glennon Phipps, MD

Pelvic inflammatory disease (PID) is broadly defined as infection of the female upper genital tract, and includes endometritis, salpingitis, oophoritis, parametritis, pelvic peritonitis, and tubo-ovarian abscess. PID is the most common serious infection of young women, and is a costly, serious public health problem. An estimated 750,000 new cases are diagnosed in the United States annually.[1] Common sequelae of UGTI include infertility, chronic pelvic pain, ectopic pregnancy, and recurrent infection. The costs of PID are staggering: in 1992, PID cost approximately 4 billion dollars. By the year 2000, the total cost, including PID's direct and indirect consequences, is projected to top $9 billion.[2]

Accurate diagnosis of UGTI is extremely important for the management of the acute disease and prevention of long-term sequelae: timely diagnosis and treatment may help prevent the devastating long-term sequelae of this disease. However, the diagnosis of PID is problematic, with high numbers of false positive and false negative diagnoses.[3]

In this manuscript, we will provide an overview of PID in Rhode Island and the United States. Our review will include etiology, epidemiology, diagnosis, treatment, sequelae and prevention.

Etiology & Pathophysiology

The etiology of PID is polymicrobial in nature.[4] In the past, many believed that the primary etiologic agent for PID was *Neisseria gonorrhoeae*. Recently, investigators have demonstrated that a wide variety of organisms can be recovered from the endometrium, fallopian tubes, ovaries, and pelvis of women with acute PID. These organisms include *N. gonorrhoeae, Chlamydia trachomatis,* aerobic and anaerobic bacteria of the endogenous vaginal flora including *Prevotella (Bacteroides)* species, *Peptostreptococci* species, *E. Coli, G. vaginalis, H. influenzae*, aerobic streptococci, and the genital mycoplasmas. The majority of proven cases of PID are associated with the sexually transmitted organisms, *N. gonorrhoeae* or C. *trachomatis*.[5,6] Twenty-five to 50% of cases of PID do not have detectable infection with *N. gonorrhoeae* or *C. trachomatis*, but other anaerobic and facultative aerobic organisms have been isolated. The non-STD organisms are quite similar to the organisms associated with bacterial vaginosis.

Abbreviations Used:

CDC	Centers for Disease Control and Prevention
CRP	C-reactive protein
ESR	Erythrocyte sedimentation rate
IUD	Intrauterine device
OC	Oral contraceptive
PEACH	PID Evaluation and Clinical Health study
PID	Pelvic Inflammatory disease
STD	Sexually transmitted disease
UGTI	Upper genital tract infection
WBC	White blood cells

There is considerable geographic variation in the identification of organisms in cases of PID. In Rhode Island, chlamydial infection is three to four times more prevalent than gonococcal infection. In a prospective cohort study performed at Women & Infants Hospital, *C. trachomatis* was three times more commonly recovered than *N. gonorrhoeae* in patients with objective evidence of upper genital tract infection.[7] *C. trachomatis* is now recognized as the most common bacterial STD in the United States, with approximately 4 million cases annually.

The majority of PID cases result from an ascending spread of microorganisms along mucosal lines from the cervix to the upper genital tract (endometrium, fallopian, tubes, ovaries, and pelvis). Between 10 - 20% of women with cervical infection with *N.gonorrhoeae* or *C. trachomatis* will develop PID.[8] In some studies, up to 40% of women with untreated infection or who have been exposed to men with chlamydial or gonococcal urethritis develop symptoms of upper tract infection.[9,10]

Epidemiology

Risk factors for PID, as well as for all STDs, include multiple recent sexual partners, early age of first intercourse, numerous lifetime sexual partners, high frequency of intercourse, selection and duration of partners, and types of sexual practices. Other risk factors include low socioeconomic status, single or divorced marital status, minority race, douching, prior history of PID or STDs, and history of tobacco, drug, or alcohol abuse. Many of these factors are risk markers for heightened sexual behavior.

Young age is a major risk factor for STDs and PID. The highest rate of PID is found among sexually active women between the ages of 15 and 25.[11] Approximately two-thirds of cases of PID are in women under the age of 25. PID rates drop drastically after the age of 35. There are multiple biological and behavioral explanations why age is associated with STDs and PID. Young women typically have a large area of columnar epithelium on the cervical portio, called cervical ectopy. This relatively large area of ectopy provides a greater surface area

for attachment of *N. gonorrhoeae* or *C. trachomatis* . Young women are also less likely to have serum and local antibodies to cervical pathogens. Young sexually active women typically have multiple partners.

The presence of cervical chlamydial or gonococcal infection is highly associated with upper tract infection. The presence of these two pathogens is more important than age, zone of cervical ectopy, or presence of antibody in producing PID. Clinical evidence of vaginal trichomonas infection or bacterial vaginosis are risk factors for upper genital tract infection.[12-14] In a cohort of women evaluated for PID in Rhode Island, the presence of bacterial vaginosis was associated with a 3-fold increased risk of objective evidence of upper genital tract infection.[15]

There is a relationship of PID and the menstrual cycle. Patients with PID and *N. gonorrhoeae* or *C. trachomatis* tend to develop symptoms of lower abdominal pain during the first part of their menstrual cycle, especially the first week following the onset of bleeding.[16] Menses may be a factor for either the dissemination or multiplication of these organisms. It is believed that cervical mucus which is lost during menses forms a mechanical barrier. The mucus also contains immunoglobulins which may present an immunological barrier to bacteria from the lower genital tract.

Contraceptive methods can affect a woman's risk of developing PID. It is well recognized that barrier contraceptive methods such as condoms, diaphragms, and spermacides, provide protection against STDs and PID when used correctly and consistently. The association of PID and oral contraceptives (OCs) is more complex. Most studies have shown that while OCs are associated with an increased risk of cervical chlamydial infection,[17] they are also associated with a 50% reduction in upper genital tract infection[18] - believed to be due to the thickening of the cervical mucus that occurs with hormonal contraception. Tubal ligation, by interrupting the integrity of the tubal mucosa, also reduces a woman's risk of PID.

Clinicians should have a low threshold when deciding whether or not to treat for pelvic inflammatory disease, given the devastating sequelae of untreated infection.

The relationship between the intrauterine device (IUD) and PID is controversial. For years, influenced by early studies evaluating IUDs including the Dalkon Shield, clinicians believed that the IUD "caused" PID. This IUD was later shown to have several design flaws (e.g. multifilament tail) that promoted ascending infection. PID is more highly associated with sexual behavior than the IUD. In fact, when one controls for sexual behavior, the relationship between IUD and PID is much less clear. Recent data suggest that the rate of PID in carefully chosen subjects is no greater than patients using no contraception, with the exception of the immediate post-insertion period. It is important to carefully select subjects for IUD use based on their sexual history and risk factors for PID.

Table 1.

Differential Diagnosis of Pelvic Inflammatory Disease

- Appendicitis
- Ectopic Pregnancy
- Endometriosis
- Gastrointestinal Disorder
- Ovarian Cyst or Tumor
  - Hemorrhagic cyst
  - Ovarian torsion
- Pelvic Adhesions
- Peritonitis
  - Intraabdominal hemorrhage
  - Pyelonephritis
  - Ruptured or perforated viscus
  - Sepsis
- Urinary Tract Infection
- Uterine Leiomyoma

Clinical Manifestations & the Diagnosis of PID

An early and accurate diagnosis of PID is imperative to manage the acute disease and to prevent long-term sequelae. The diagnosis of PID, however, is problematic since patients present with a wide variety and severity of symptoms. Patients with PID may be misdiagnosed as having gastrointestinal or noninfectious gynecologic illnesses. Undiagnosed PID results in delay or failure of treatment, which increases the risk of long-term sequelae.[19] Both underdiagnosis and overdiagnosis are common, and the list of conditions that must be considered in the differential diagnosis is extensive (Table 1).[3]

Minimal clinical criteria for the diagnosis of PID as outlined in the Sexually Transmitted Disease Treatment Guidelines include abdominal, cervical motion, and adnexal tenderness (either unilateral or bilateral).[20] Unfortunately, these criteria, based on a bimanual pelvic examination, are neither sensitive nor specific for the diagnosis of PID. Therefore, the Centers for Disease Control and Prevention (CDC) and the Infectious Disease Society for Obstetrics and Gynecology have specified laboratory criteria which further support the diagnosis.[20]

Supportive laboratory criteria include: abnormal vaginal discharge with increased numbers of white blood cells, elevated erythrocyte sedimentation rate (ESR), elevated C-reactive protein (CRP), or increased white blood cell count (WBC). Hagdu and colleagues, using multivariate analysis to identify important predictors of PID, found abnormal vaginal discharge in virtually all women with salpingitis.[21] In a prospective assessment of laboratory criteria for the diagnosis of PID, we found that an abnormal vaginal discharge (leukorrhea defined as more white blood cells than epithelial cells) had the highest sensitivity for upper tract in-

Table 2.
Diagnostic Test Characteristics of Laboratory Tests for the Diagnosis of PID

Test	Sensitivity	Specificity	Predictive Value Negative	Predictive Value Positive
ESR	72%	53%	56%	70%
CRP	76%	59%	62%	74%
WBC	66%	80%	61%	83%
Vaginal WBCs	87%	38%	66%	68%

ESR = erythrocyte sedimentation rate
CRP = C-reactive protein
WBC = white blood cells

fection (Table 2).[22] These studies underscore the importance of a careful evaluation of the vaginal discharge in a young woman who presents with acute abdominal or pelvic pain.

Other laboratory tests that may be helpful include a peripheral white blood cell count and a CRP. CRP has a higher sensitivity and specificity than an ESR for the diagnosis of upper tract infection.[22] WBC count was highly specific (80%) in our cohort of women evaluated for PID in Providence. Combinations of laboratory tests can improve the predictive value of our diagnostic evaluation (Table 3).[22]

Elaborate criteria to support the diagnosis of PID include an endovaginal ultrasound, endometrial biopsy, or laparoscopy. A vaginal ultrasound demonstrating fluid-filled fallopian tubes or a tubo-ovarian complex has a high positive predictive value for the diagnosis of UGTI.[7] Endometrial biopsy demonstrating acute endometritis has a high sensitivity and specificity when compared to laparoscopy for the diagnosis of PID.[23] Laparoscopy, although invasive and expensive, is still considered the gold standard for the diagnosis of PID. In severe cases with marked clinical symptoms, laparoscopy may be indicated to rule-out appendicitis, tubal torsion, or other acute intra-abdominal emergencies. Laparoscopy is also indicated when the diagnosis is in question. A carefully performed laparoscopy can help avoid unnecessary and costly hospital admissions.

In summary, any pelvic tenderness in a young woman at-risk should trigger an evaluation for PID. Clinicians should have a low threshold when deciding whether or not to treat for PID, given the devastating sequelae of untreated infection.

Table 3.
Diagnostic Test Characteristics of Combinations of Laboratory Tests

Number of Abnormal Tests	Sensitivity	Predictive Value Specificity	Predictive Value Negative	Positive
One	100%	18%	100%	65%
Two	79%	50%	61%	70%
Three	62%	87%	60%	88%
Four	29%	95%	47%	90%

Treatment

Once the diagnosis of PID is made, treatment should be instituted immediately. Established regimens for inpatient and outpatient treatment of PID provide broad spectrum coverage of the likely pathogens involved (see Etiology).

The decision to treat PID in the hospital or with parenteral antibiotics is based on recommendations from CDC.[20] In general, women who often do not comply with an oral antibiotic regimen should be treated with intravenous medications. This group includes most adolescents and women with gastrointestinal symptoms which impair their ability to tolerate oral medications. Patients with an uncertain diagnosis, suspected pelvic abscess, pregnancy, recent uterine instrumentation, use of an IUD, HIV-positive status, or failed response to outpatient therapy should also be hospitalized. Because the development of sequelae is unpredictable, some experts have recommended that all women who wish to maintain their fertility be hospitalized.

Several antibiotic regimens (Table 4) have been found to be effective through multicenter randomized trials.[20] All parenteral antibiotic regimens should be continued for 48 hours after the patient demonstrates clinical improvement. The patient should be continued on oral antibiotics for a total duration of 14 days of therapy.

Clinical improvement should be noted within 3 to 5 days of initiating therapy. Objective reduction in fever, improvement in abdominal tenderness, and a decrease in uterine adnexal and cervical motion tenderness all signal clinical improvement. If symptoms persist and no objective evidence of improvement is noted, further diagnostic evaluation is indicated and possibly surgical intervention.

If the patient is a candidate for outpatient treatment, one of the CDC-approved outpatient regimens should be initiated (Table 4).[20] A patient should be evaluated within 72 hours of initiating treatment to assess improvement in symptoms. Patients who do not improve within 72 hours with outpatient therapy should be evaluated for accuracy of diagnosis and the need for parenteral therapy.

There have been no long-term studies of outpatient versus inpatient (parenteral) therapy for PID, comparing rates of sequelae such as infertility. Although most women in the United States are treated for PID as outpatients, mainly due to cost, it is unknown whether the inpatient approach will be more or less cost-effective when long-term sequelae are considered. Women & Infants Hospital is part of a multicenter clinical trial (sponsored by the Agency for Health Care Policy and Research) designed to answer this question. The PEACH study (PID Evaluation and Clinical Health Study) will recruit 1200 patients, suspected of having PID, from seven clinical sites in the United States and will randomize these women to outpatient or inpatient therapy. Women will be followed for 3 - 5 years for the development of tubal factor infertility and other long-term sequelae.

From a public health standpoint, it important to evaluate and treat the sexual partners of women being treated for

PID. The risk for reinfection to the patient is significant. The partner should be treated empirically for *N. gonorrhoeae* and *C. trachomatis* regardless of the organism(s) isolated from the patient.

Sequelae and Prevention

Major medical sequelae of PID include recurrent PID and tubo-ovarian abscess formation, ectopic pregnancy, infertility, and chronic pelvic pain. Twenty to 25% of women diagnosed with PID will have a recurrence. Approximately one-third of women hospitalized for PID will undergo surgery for their condition, generally because of abscess formation. There is a seven-fold increased risk of ectopic pregnancy after a single episode of PID; this increases to a relative risk of 28 after three or more episodes.[24,25] A large cohort study of women with laparoscopic-proven PID demonstrated that approximately one-fifth of women who had at least one episode of PID experienced tubal factor infertility.[25] This risk doubles with each episode of PID. More that 50% of women with three or more episodes of PID are infertile. Chronic pelvic pain occurs in 20 - 25% of women with a history of PID, and can severely alter a patient's functional status and quality of life.

Due to the devastating sequelae of this disease, the prevention of PID is extremely important. Strategies to prevent PID as well as other STDs include primary prevention, or efforts to prevent initial chlamydial or gonococcal infection; secondary prevention, targeted at early detection and prompt and effective intervention; and tertiary prevention aimed at reducing long-term sequelae of the disease. Primary prevention would include behavioral changes that reduce the risk of acquiring STDs, such as reducing the number of sexual partners, delaying age at first intercourse, careful partner selection, and using barrier methods of contraception and methods of hormonal contraception. In addition, primary prevention would include screening and treating persons with cervical infection before ascending infection causes PID. Screening often targets high-risk populations such as adolescents, persons with multiple sexual partners, and individuals with other sexually transmitted diseases. In a recent study published in the *New England Journal of Medicine*, a routine strategy to identify and treat women at increased risk for cervical chlamydial infection reduced the incidence of pelvic inflammatory disease.[26]

Secondary prevention strategies attempt to detect the disease at an early stage among persons already infected with PID. This would include early identification of PID in women with signs of abnormal vaginal discharge, mucopurulent cervicitis, and urethral syndrome. Other signs of ascending infection that are not classically considered "signs" of PID included abnormal uterine bleeding, dyspareunia, dysuria, back pain, and gastrointestinal symptoms. By identifying cases early, therapy can be instituted to restore the patient to good health and to avoid long-term sequelae. Any measures taken to reduce or eliminate long-term impairment or disability, such as infertility or chronic pelvic pain, are efforts toward tertiary prevention.

Table 4:
Regimens with Proven Efficacy as Therapy for Pelvic Inflammatory Disease

Inpatient (Parenteral) Treatment

Regimen A

Cefoxitin 2 grams IV every 6 hours or Cefotetan 2 grams IV every 12 hours

PLUS

Doxycycline 100 mg IV or orally every 12 hours

Regimen B

Clindamycin 900 mg IV every 8 hours

PLUS

Gentamicin loading dose IV or IM (2 mg/kg of body weight) followed by a maintenance dose (1.5 mg/kg) every 8 hours

Alternative Regimens

Alternative A

Ampicillin/sulbactam 3 gms IV every 6 hours

PLUS

Doxycycline 100 mg IV or orally every 12 hours

Alternative B

Ofloxacin 400 mg IV every 12 hours

PLUS

An anaerobic antibiotic such as Clindamycin or Metronidazole

Outpatient Treatment

Regimen A

Cefoxitin 2 grams IM plus 1 gram Probenecid orally or Ceftriazone 250 mg IM

PLUS

Doxycycline 100 mg IV or orally every 12 hours

Regimen B

Ofloxacin 400 mg orally 2 times a day for 14 days

PLUS

Either Clindamycin 450 mg orally four times a day or Metronidazole 500 mg orally twice a day for 14 days

References

1. Expert Committee on Pelvic Inflammatory Disease. Pelvic inflammatory disease: Research direction in the 1990s. *Sex Trans Dis* 1991;18:46-64.
2. Washington AE, Katz P. Cost and payment source for pelvic inflammatory disease. Trends and projections, 1983 through 2000. *JAMA* 1991;266(18):2565-2569.
3. Peipert JF, Soper DE. Diagnostic evaluation of pelvic inflammatory disease. *Infect Dis Obstet Gynecol* 1994;2(1):38-48.
4. Eschenbach DA, Buchanan T, Pollock HM, et al. Polymicrobial etiology of acute pelvic inflammatory disease. *N Engl J Med* 1975;293:166.

5. Rice PA, Schachter J. Pathogenesis of pelvic inflammatory disease. *JAMA* 1991;266:2587-2593.
6. Jossens MOR, Schachter J, Sweet RL. Risk factors associated with pelvic inflammatory disease of differing microbial etiologies. *Obstet Gynecol* 1994;83:989-997.
7. Boardman LA, Peipert JF, Brody JM, et al. Endovaginal sonography for the diagnosis of upper genital tract infection. *Obstet Gynecol* 1997;90:54-7.
8. Sweet RL. Diagnosis and treatment of acute salpingitis. *J Reprod Med* 1977;19:21.
9. Platt R, Rich PA, Mccormack WM. Risk of acquiring gonorrhea and prevalence of abnormal adnexal findings among women recently exposed to gonorrhea. *JAMA* 1983;250:3205-3209.
10. Stamm WE, Guinan ME, Johnson C, et al. Effect of treatment regimens for *Neisseria gonorrhoeae* on simultaneous infection with *Chlamydia trachomatis*. *N Engl J Med* 1984;310:545-549.
11. McCormack WM, Stumacher RJ, Johnson K, et al. A clinical spectrum of gonococcal infection in women. *Lancet* 1977;1:1182-1186.
12. Hillier SL, Kiviat NB, Hawes SE, et al. Role of bacterial vaginosis-associated microorganisms in endometritis. *Am J Obstet Gynecol* 1987;94:454-60.
13. Korn AP, Bolan G, Padian N, et al. Plasma cell endometritis in women with symptomatic bacterial vaginosis. *Obstet Gynecol* 1995;85:387-90.
14. Eschenbach DA, Hillier SL, Critchlow CW, et al. Diagnosis and clinical manifestations of bacterial vaginosis. *Am J Obstet Gynecol* 1988;158:819-28.
15. Peipert JF, Montagno AB, Cooper AS, Sung J. Bacterial vaginosis as a risk factor for upper genital tract infection. *Am J Obstet Gynecol* (in press).
16. Sweet RL, Blankfort-Doyle M, Robbie MO, et al. The occurrence of chlamydial and gonococcal salpingitis during the menstrual cycle. *JAMA* 1986;255:2062-2064.
17. Cromer A, Heald FP. Pelvic inflammatory disease associated with *Neisseria gonorrhoeae* and *Chlamydia trachomatis*: Clinical correlates. *Sex Trans Dis* 1987;14:125-129.
18. Westrom L, Bengtsson L-P, Mardh P-A. The risk of pelvic inflammatory disease in women using intrauterine contraceptive devices as compared to nonusers. *Lancet* 1976;2:221-224.
19. Hillis SD, Riduian J, Marchbanks PA, et al. Delayed care of pelvic inflammatory disease as a risk factor for impaired fertility. *Am J Obstet Gynecol* 168:1503-1509, 1993.
20. Centers for Disease Control and Prevention. 1993 Sexually transmitted diseases treatment guidelines. *MMWR* 1993;42 (No. RR-14):75-81.
21. Hagdu A, Westrom L, Brooks C, et al. Multivariate analysis of prognostic variables in patients with acute pelvic inflammatory disease. *Am J Obstet Gynecol* 155:954-960, 1986.
22. Peipert JF, Boardman L, Hogan JW, et al. Laboratory evaluation of acute upper genital tract infections. *Obstet Gynecol* 1996;87:730-6.
23. Kiviat NB, Wolner-Hanssen P, Eschenbach DA, et al. Endometrial histopathology in patients with culture-proved upper genital tract infection and laparoscopically diagnosed acute salpingitis. *Am J Surg Pathol* 14:167-175, 1990.
24. Westrom L, Joesoef MJ, Reynolds G, et al. Pelvic inflammatory disease and infertility: A cohort study of 1844 women with laparoscopically verified disease and 657 control women with normal laparoscopic results. *Sex Trans Dis* 1992:19:185-92.
25. Westrom L. Sexually transmitted diseases and infertility. *Sex Trans Dis* 1994;21:S32-S37.
26. Scholes D, Stergachis A, Heidrich FE, et al. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection. *New Engl J Med* 1996;334-1362-6.

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Pathogenesis of Human Papillomavirus Infection of the Genitals

Lundy Braun, PhD, and Wendy Sears Hall, ScB

In April 1996, the National Institutes of Health convened a consensus conference to assess current knowledge on screening, prevention, and treatment of cancer of the uterine cervix. A primary conclusion of the conference was that human papillomaviruses (HPV) are causally involved in the development of cervical cancer. It has been over 20 years since zar Hausen first suggested that papillomaviruses were related to carcinoma of the cervix.[1] Soon after he proposed this hypothesis, several groups reported that the presence of koilocytotic atypia in cervical smears represented morphologic evidence of HPV infection, thereby setting the stage for further exploration of the association between HPVs and cervical disease. In 1980, HPV6 was cloned from a genital wart, also called condyloma acuminatum, followed by HPV11 also from a condyloma in 1982, HPV16 from a cervical cancer in 1983, and HPV18 from another cancer of the cervix in 1984.[1] Within a few more years, the extraordinary multiplicity of papillomavirus types — now numbering approximately 100 — was recognized. More than 35 HPV types have been isolated from the anogenital tract, but a more restricted range of HPVs is associated with intraepithelial neoplasia. HPV types 6 and 11 are found primarily in benign lesions with low malignant potential, whereas HPV types 16, 18, 31, 33 and 35 are the most frequent types in high grade lesions and invasive cancers[2] (Table 1).

The intense research interest in cervical cancer stems not only from the fact that it is the second leading cause of cancer and cancer mortality in women worldwide,[3] but also that it strikes young women and is largely preventable through simple screening methods. Although the death rates in industrialized countries have fallen dramatically since widespread screening was instituted, further progress in reducing the incidence of invasive cancer in developed nations will depend on improving outreach to unscreened populations of women and on applying new approaches to prevention. More than 80% of new cases are diagnosed in developing parts of the world where cervical cancer remains the leading cause of cancer-related deaths for women: it has been estimated that screening women just once around age 45 would prevent a large proportion of these deaths.[4]

Abbreviations Used:

ASCUS	Atypical squamous cells of undetermined significance
CIN	Cervical intraepithelial neoplasia
CRPV	Cottontail rabbit papillomavirus
HPV	Human papillomavirus
HSIL	High grade squamous intraepithelial lesion
LCR	Long control region
LSIL	Low grade squamous intraepithelial lesion
ORF	Open reading frame
PCR	Polymerase chain reaction
SIL	Squamous intraepithelial lesion
TGF-ß	Transforming growth factor-ß
TNF-a	Tumor necrosis factor-a

In the genital tract, malignancy is preceded by precursor lesions that are histologically classified by the degree of nuclear and cytological atypia and differentiation properties of the lesions. It is now generally accepted that koilocytotic atypia and squamous intraepithelial lesions (SIL) are morphological manifestations of HPV infection in the anogenital tract. According to the Bethesda system, three types of abnormalities are recognized in Pap smears — atypical squamous cells of undetermined significance (ASCUS), low grade squamous intraepithelial lesions (LSIL) which are equivalent to mild dysplasia or cervical intraepithelial neoplasia (CIN) 1, and high grade squamous intraepithelial lesions (HSIL) which correspond to moderate to severe dysplasia/carcinoma in situ (CIN 2 and CIN 3/CIS). An important advance over the past 15 years has been the demonstration that 94% of SIL and 93% invasive cancers contain HPV genomes.[5]

Table 1.
Summary of Genital Tract HPV Types and Associated Lesions*

Clinical Lesion	HPV Type
Condylomata acuminata	HPV **6, 11,** 42, 43, 44
LSIL	all HPVs that infect the genital tract
HSIL	HPV **16, 18,** 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 67, 68
Invasive cervical cancer	HPV **16, 18,** 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66, 67, 68

*adapted from Stoler, 1996; bold type indicates most common types.

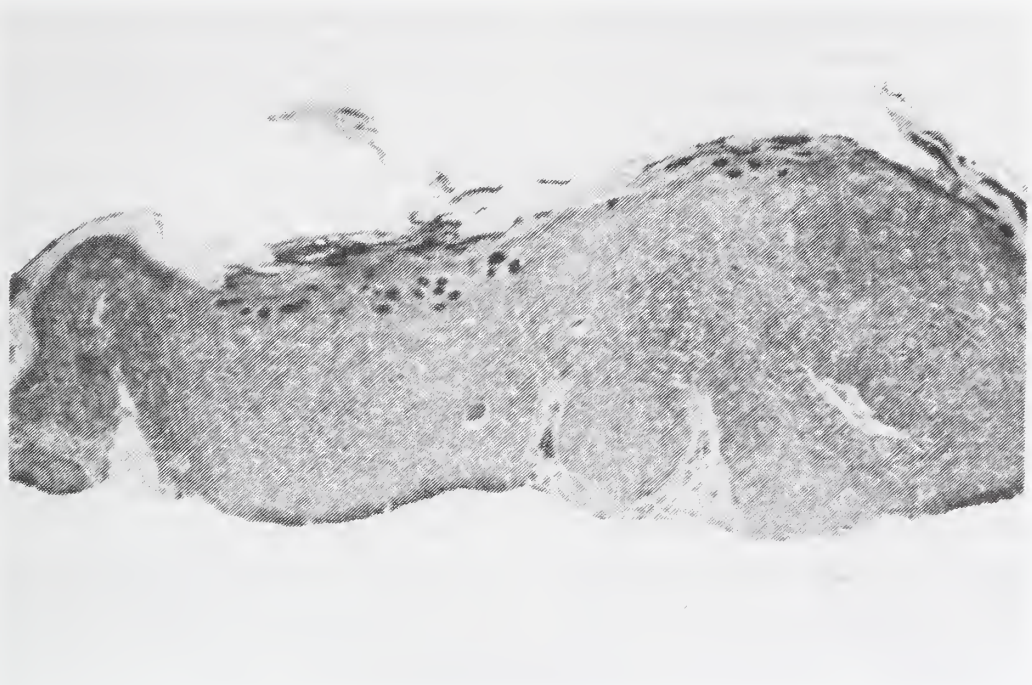

Figure 1. Immunohistochemical staining of a histological section of bowenoid papulosis with an antibody that detects viral capsid proteins. Note staining is localized to the nuclei of cells in the superficial layers of the epithelium. Only a small proportion of cells are positive.

This review focuses on our current understanding of the biology of HPVs, the epidemiology of genital tract HPV infection, and the mechanisms by which genital HPVs transform infected cells. We conclude by addressing some of the dilemmas facing clinicians in the treatment of precancerous lesions of the cervix.

Biology of HPVs

Papillomaviruses are small DNA viruses that produce benign warts or, infrequently, malignant tumors. These viruses are highly tissue-specific, almost exclusively infecting epithelial cells that line cutaneous and mucosal surfaces. The transmissibility of human warts was first demonstrated by Ciuffo in 1907 using cell-free filtrates of wart extracts.[1] Transmission of papillomaviruses in nature occurs through direct contact of infected cells with uninfected tissue. For genital HPVs, transmission is sexual. Access of virus to basal cells is thought to be facilitated by microlesions in the epithelium, although this has not been formally proven. In his classic study, Oriel[6] estimated the infectivity rate of genital warts to be 64% with an incubation period ranging from 3 weeks to 8 months.

Because HPVs do not grow readily in tissue culture, the viral life cycle is poorly understood. However, the localization of virus particles in differentiated epithelium and recent molecular studies showing binding of tissue-specific transcription factors to regulatory regions in the HPV genome[7] clearly indicate that control of virus gene expression and virus maturation is tightly linked to the differentiation state of squamous epithelium. Replication of viral DNA and early gene expression occur in the basal layer of the epithelium, whereas productive infection with virus capsid protein production and particle assembly, as shown by electron microscopy or immunohistochemical staining, occurs only in terminally differentiated cells of stratified squamous epithelium (Figure 1). Thus, benign warts and LSILs that are at least partially differentiated are permissive for virion production and potentially infectious; undifferentiated HSILs and cervical cancers are, on the other hand, less permissive and most likely less infectious.

Most HPVs were isolated and molecularly cloned directly from biopsy specimens. New types are distinguished on the basis of DNA sequence homology with previously characterized papillomavirus types. The 8 kilobasepair, double-stranded, circular genome of papillomaviruses is organized into early and late regions composed of eight open reading frames (ORFs; Figure 2). Viral gene products from the E1, E2, E5, E6, and E7 early regions are important in the regulation of virus replication, transcription and cellular transformation. Proteins encoded by E4 bind to cytoplasmic cytokeratins and the late region ORFs L1 and L2 code for virus capsid proteins and are synthesized exclusively in fully differentiated squamous epithelium. In addition, DNA sequences in the noncoding long control region (LCR) regulate the expression of the ORFs.

In contrast to the strong association of genital HPVs with neoplastic lesions, HPVs that infect cutaneous epithelium were believed, until recently, to produce only benign papillomas. The main exception was patients with Epidermodysplasia Verruciformis who have widespread HPV infection and develop squamous cell carcinomas on sun-exposed areas of the skin. Recent studies indicating that a high proportion of skin cancers in immunosuppressed and non-immunosuppressed patients contain HPV DNA are intriguing, although whether

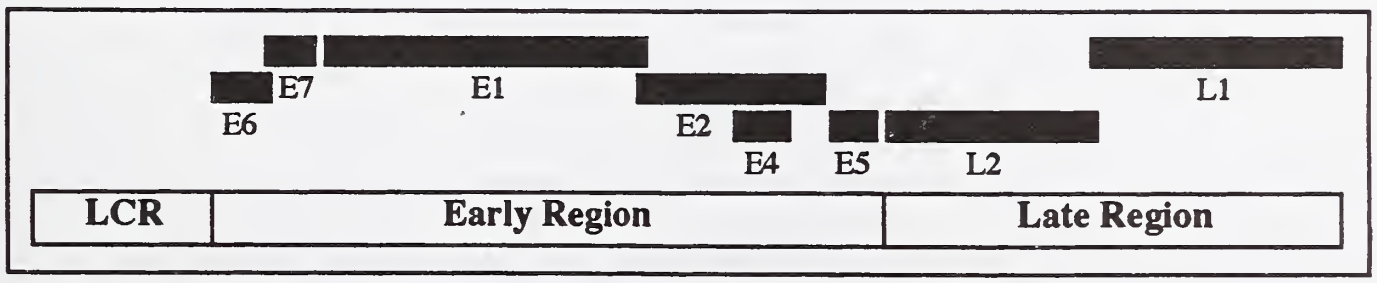

Figure 2. Schematic diagram showing the organization of the ORFs of the HPV16 genome.

HPVs are etiologically involved in the genesis of these cancers remains to be demonstrated.[8]

Epidemiology of genital tract HPV infection

The most common risk factors for cervical cancer are early age of onset of sexual activity, multiple male sex partners, sex with a partner who has had multiple partners, smoking, use of oral contraceptives, parity, and early age of first pregnancy. Some of these risk factors are surrogate markers for infection with HPVs, although studies differ on which risk factors represent variables independent of HPV infection. In particular, the question of whether progression to invasive cervical cancer occurs more readily in women who acquired HPV infection at a young age is still unresolved.

The major barrier to epidemiological studies of viral infection has been the lack of sensitive and specific tools for detection of HPV in clinical samples. The most common assays employed in epidemiological studies of HPV are Southern blot hybridization, in situ hybridization, polymerase chain reaction (PCR)-based analysis and, more recently, the nonradioactive hybrid capture assay. PCR is rapid and sensitive and therefore has been used in several large-scale epidemiological studies.

Genital tract HPV infection may be the most common sexually transmitted disease,[2] although precise incidence rates are not available because HPV infection is not a reportable disease. In the United States, the frequency of detection of HPV infection is highest in sexually active women between the ages of 15 and 25 years, increases with the number of male sex partners, and declines with age.[3] This pattern is similar to that described by Oriel[6] where the peak of onset of genital warts occurred at age 19 in women and age 22 in men, paralleling that of gonorrhea in this population. Estimates of prevalence of genital HPV in cytologically normal women vary widely depending on the sensitivity of the detection method. Current estimates range from 20% to 40%.[2]

Little is known about the prevalence of infection and its relationship to sexual activity in men, in part because HPV-induced penile lesions tend to be clinically inapparent. However, males represent a large reservoir of infection and more data on the pathogenesis of HPV infection in males is urgently needed. Not surprisingly, recent research has clearly established that the risk of cervical cancer is elevated significantly in women whose male partners have multiple sex partners and who harbor HPV infection of the penis.[9] The lack of information about the pathogenesis of HPV infection in males is not only an issue for their sexual partners but is also an important concern for men who develop clinical disease.

Cervical cancer is the second leading cause of cancer and cancer mortality in women worldwide.

Natural history of HPV infection of the female genital tract

Infection of cervical epithelium with HPV can lead to clinical, subclinical, or latent disease. The majority of HPV infections are clinically inapparent, transient, especially in younger women, and only rarely progress to preinvasive cervical disease or invasive cancer over a period of 10 to 20 years. It is estimated that there are 2 million cases of ASCUS, 1.25 million cases of LSIL, 300,000 cases of HSIL and 15,000 cases of invasive cancer diagnosed each year in the United States.[10] Persistent HPV infection associated with older age, infection with high risk types, and high viral load is responsible for most cases of SIL.[11] Support for an etiological relationship between HPV and SIL comes from large cohort studies, showing that HPV positivity occurs approximately 24 months prior to development of SIL.[12] Overall, it is estimated that less than 2% of mild dysplasias will progress to invasive cancer; the vast majority of lesions will persist or regress spontaneously.[5] HPV types 16 and 18 and perhaps minor variants of HPV16 are associated with an increased risk of progression to HSIL and invasive cancer.[12,13] A model for progression to cervical cancer, incorporating some of the potential cofactors, is shown in Figure 3.

Evidence for a central role of the humoral and cellular immune response in the regulation of HPV infection comes from many types of studies in animal models and humans. Renal transplant patients and patients receiving immunosuppressive therapies, as well as HIV-infected women, have difficulty clearing virus and are at higher risk of developing SIL. With the recent development of serological techniques for detection of HPV type-specific antibodies and the availability of antigen for cell-mediated assays, a more detailed understanding of the immunology of HPV infection should be forthcoming.

Although many questions regarding the natural history of HPV infection of the genital tract remain, the sum of the evidence that HPVs are involved in cervical cancer is strong. Over 90% of cervical cancers contain HPV DNA, the majority of established cervical carcinoma cell lines harbor HPV DNA and express HPV mRNAs and proteins, and HPV infection precedes the development of invasive cervical cancer by 15 to 30 years. Moreover, high risk HPV DNA can transform epithelial cells in culture as discussed below.

Mechanisms of HPV-mediated transformation

In 1934, Rous and Beard provided the first experimental evidence in cottontail rabbits that malignant tumors were associated with a wart virus infection.[1] Since that time the cottontail rabbit papillomavirus (CRPV) has continued to be a useful model for studying the mechanisms of papillomavirus-associated carcinogenesis. Interestingly, in this model, cancers due to infection with cottontail rabbit papillomavirus (CRPV) develop

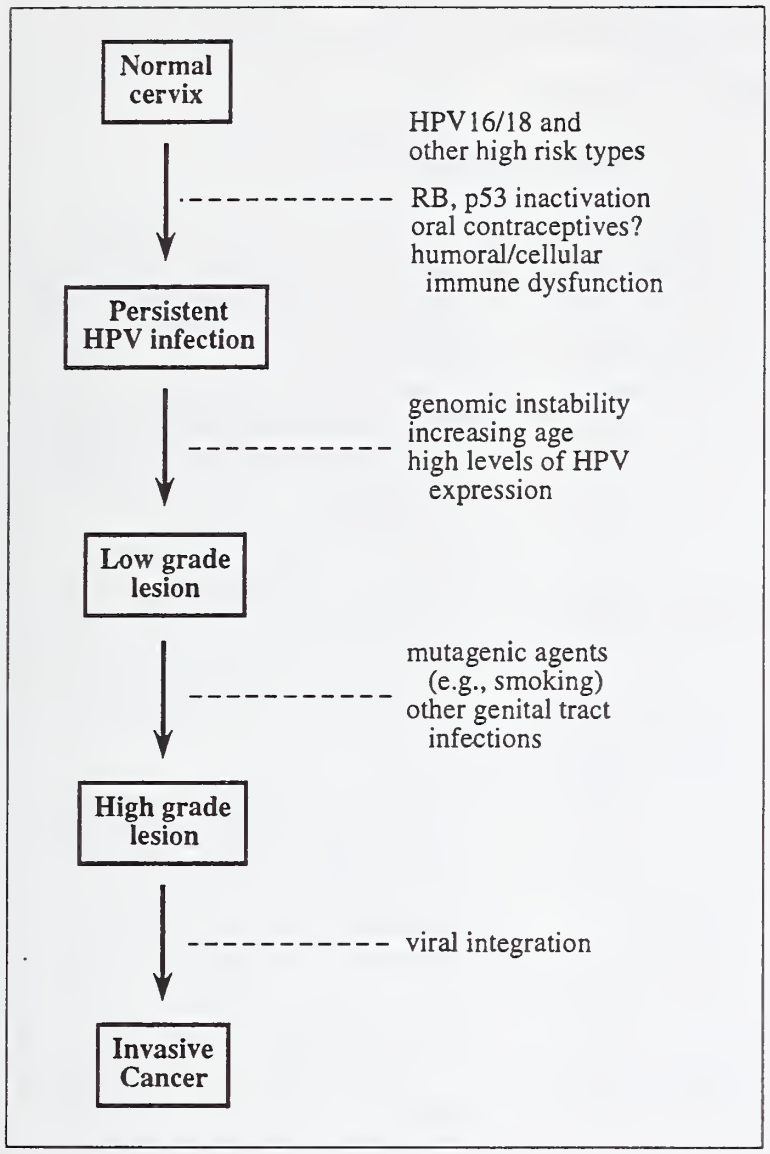

Figure 3. Model of the progression of cervical cancer.

at a higher rate in domestic rabbits than in wild rabbits, supporting the notion that genetic and other presently unknown factors in addition to papillomavirus infection are required for malignant transformation. Cofactors described in papillomavirus models of carcinogenesis include chemicals such as tar in skin cancers in rabbits, bracken fern in alimentary tract and bladder cancers in cattle, and ultraviolet radiation in humans with Epidermodysplasia Verruciformis.[14]

In human genital tract cancers, the same general model indicating the importance of cofactors in papillomavirus-mediated transformation holds, although the details remain to be elucidated. As mentioned above, HPV infection is common, yet invasive cancer is a relatively rare outcome of infection, even in untreated women. Some of the biologic cofactors for which there is epidemiological evidence of an association with genital tract cancer include smoking, use of oral contraceptives, immune deficiency, and infection with herpes virus or cytomegalovirus. Most appear to be progression factors, not simply markers of sexual activity and HPV infection.

Although we have little information on which specific cofactors are important in cancer of the anogenital tract, molecular and biochemical studies have elucidated the role for papillomavirus genes in transformation. Epidemiological studies provided strong evidence of a role for HPVs, particularly HPV16 and HPV18, in cervical cancer. Laboratory studies confirmed these findings and led to the development of a cell culture model for transformation. Several groups showed that HPV16 or HPV18 DNA transformed primary cultures of human foreskin or cervical keratinocytes. It was subsequently shown that the transforming activity of HPV16 and HPV18 could be localized to the E6 and E7 genes. These findings acquired additional significance when it was demonstrated that the E6 protein from either HPV16 or HPV18 bound to the p53 growth inhibitory protein and E7 bound to the pRB tumor suppressor protein. Binding of low-risk HPV6 E6 and E7 to p53 and pRB did occur but with much lower affinity than the high-risk HPV types[1]. In both cases, it is postulated that these interactions between viral and host cellular proteins modify the growth regulatory mechanisms of HPV-infected cells, thereby stimulating cellular proliferation.

Whether alterations in p53- and pRB-regulated growth control are obligatory steps in progression of infected cells to malignancy is not clear. Additional changes in infected cells during malignant progression include loss of responsiveness to signals such as transforming growth factor-b (TGF-b), tumor necrosis factor-a (TNF-a), and other products released by macrophages that downregulate HPV transcription.[15,16]

A critical event in progression to malignancy in cervical tissue seems to be integration of virus sequences into the cellular genome. Benign cervical lesions harbor extrachromosomal HPV, whereas the majority of cervical cancers contain integrated viral DNA. Integration is random in the cellular genome but usually interrupts the E1 and/or E2 ORFs. Since these ORFs code for factors that regulate the transcription of virus oncoproteins E6 and E7, integration may lead to persistent expression of these oncoproteins. Complicating the story, however, are reports that some cervical cancers and cell lines express exclusively episomal HPV16 DNA.[17,18] These findings suggest that alternative mechanisms for deregulation of HPV16 virus gene expression exist. All HPV18-related cancers described to date harbor integrated virus sequences.

Management of HPV

Infection

There is no treatment to eradicate HPV infection. Management of cervical disease is directed at prevention or detection of preinvasive disease through Pap smear screening and removal of clinical lesions. HPV prevention programs targeted to adolescent and young adult populations are limited and center on encouraging a reduction in the number of sexual partners and the use of barrier methods of contraception such as diaphragms or condoms. While diaphragms and condoms undoubtedly reduce risk, the degree of protection afforded is unclear since neither prevents scrotal to vulvar transmission.[19] The development of a prophylactic vaccine for HPV has been hampered by the lack of pure antigen for use as immunogen. The recent availability of recombinant viruses that express HPV proteins represents a significant step in the development of prophylactic and

therapeutic vaccines, but it will be many years before such vaccines can be used in clinical practice.[4]

In the United States, it is estimated that approximately half of women with newly diagnosed cervical cancer have never had a Pap smear.[20] At the same time, treatment of low grade lesions detected in Pap smears present a therapeutic dilemma for clinicians because so many of these lesions disappear spontaneously and there are no biological markers that predict the natural history of individual lesions. Current practice calls for Pap smear screening of women with low grade lesions at regular intervals and removal of high grade lesions. The optimal approach to management of mild cervical abnormalities should become clear when the ASCUS/LSIL Triage Study sponsored by the National Cancer Institute is completed.

The role of HPV testing as an adjunct to cytological screening is also being evaluated in the ASCUS/LSIL Triage Study. Those in favor of testing argue that virus typing would guide treatment; infection with low risk virus would call for less aggressive treatment than infection with high risk virus. It is important to note that testing as presently conceived focuses on SIL, most of which are reversible. Therefore, testing for HPV may only marginally reduce the incidence of invasive cancer .

Recurrence of SIL after treatment is high, often involving activation of latent or subclinical HPV infection. The majority of male partners of women with clinical evidence of HPV infection are also infected with HPV but whether treatment of male partners influences the recurrence rate in women is a matter of debate.[19]

Conclusion

Significant progress in understanding the pathogenesis of HPV infection and the role of HPV in the multistep process of cervical carcinogenesis has been made in the past decade. Nevertheless, several key questions about the natural history of HPV infection of the anogenital tract remain: When during the course of infection is an individual most infectious and how efficient is transmission of infection? Are HPV-negative cervical cancers truly negative? What host factors contribute to the persistence of HPV infection? How does the host immune response regulate infection and progression to invasive disease? Which low grade lesions have a high probability of regressing without treatment and which ones will progress to cancer? Improved methods of managing HPV infection await answers to these questions.

References

1. zur Hausen, H. Roots and perspectives of contemporary papillomavirus research. *J Cancer Res Clin Oncol* 1996; 122:3-13.
2. Bosch FX, Manos MM, Muñoz N, Sherman M et al. International Biological Study on Cervical Cancer (IBSCC) Study Group. Prevalence of human papillomavirus in cervical cancer: a worldwide perspective. *J Natl Cancer Inst* 1995; 87:796-802.
3. Herrero R. Epidemiology of cervical cancer. *Monograph Natl Cancer Inst* 1996;21:1-6
4. Birley HDL. Human papillomaviruses, cervical cancer and the developing world. *Ann Trop Med Parasit* 1995; 89:453-463.
5. Mitchell MF, Tortolero-Luna G, Wright T, et al. Cervical human papillomavirus infection and intraepithelial neoplasia: a review. *Monograph Natl Cancer Inst* 1996; 21:17-26.
6. Oriel JD. Natural history of genital warts. *Br J Vener Dis* 1971;47:1-13.
7. Stoler MH. A brief synopsis of the role of human papillomaviruses in cervical carcinogenesis. *Am J Obstet Gynecol* 1996; 175:1091-8.
8. Shamanin V, zur Hausen H, Lavergne D, et al. Human papillomavirus infections in nonmelanoma skin cancers from renal transplant recipients and nonimmunosuppressed patients. *J Natl Cancer Inst* 1996; 88:802-811.
9. Bosch FX, Castellsagué X, Muñoz N, et al. Male sexual behavior and human papillomavirus DNA: Key risk factors for cervical cancer in Spain. *J Natl Cancer Inst* 1996; 88:1060-7.
10. Solomon D. Pap test abnormalities by diagnosis. *J Natl Cancer Inst* 1997;89:475.
11. Schiffman MH, Bauer HM, Hoover RN, et al. Epidemiologic evidence showing that human papillomavirus infection causes most cervical intraepithelial neoplasia. *J Natl Cancer Inst* 1993; 85:958-64.
12. Koutsky LA, Holmes KK, Critchlow CW, et al. A cohort study of the risk of cervical intraepithelial neoplasis grade 2 or 3 in relation to papillomavirus infection. *N Engl J Med* 1992; 327:1272-8.
13. Xi LF, Koutsky LA, Galloway DA, et al. Genomic variation of human papillomavirus type 16 and risk for high grade cervical intraepithelial neoplasia. *J Natl Cancer Inst* 1997; 89:796-802.
14. Jackson ME, Campo MS, Gaukroger JM. Cooperation between papillomavirus and chemical cofactors in oncogenesis. *Crit Rev Oncogen* 1993; 4:277-291.
15. Braun L, Dürst M, Mikumo R, Gruppuso P. Differential response of nontumorigenic and tumorigenic human papillomavirus type 16-positive epithelial cells to transforming growth factor B_1. *Cancer Res* 1990; 50:7324-7332.
16. zur Hausen H, Rösl F. Pathogenesis of cancer of the cervix. *Cold Spring Harbor Symposia on Quant Biol* 1994; 59:623-628.
17. Cullen AP, Reid R, Campion M, Lörincz AT. Analysis of the physical state of different human papillomavirus DNAs in intraepithelial and invasive cervical neoplasm. *J Virol* 1991; 65:606-612.
18. Braun L, Mikumo R, Mark HPL, Lauchlan S. Analysis of the growth properties and physical state of the human papillomavirus type 16 genome in cell lines derived from primary cervical tumors. *Am J Path* 1993; 143:832-844.
19. Verndon ME. Issue in the management of human papillomavirus genital disease. *Am Fam Physician* 1997; 55:1813-1816, 21, 22.
20. Brown CL. Screening patterns for cervical cancer: how best to reach the unscreened population. *Monograph Natl Cancer Inst* 1996; 21:7-11.

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HIV Infection in Rhode Island Adolescents

David Pugatch, MD, Josiah D. Rich, MD, and Timothy P. Flanigan, MD

HIV infection in adolescents and young adults ages 13 through 24 is a growing problem in the United States, and has become a focus for education and prevention nationally and locally. The age at which Americans acquire HIV infection has steadily declined over the course of the epidemic, and half of all new infections in the U.S. are now estimated to occur in persons under 25 years of age.[1] Unfortunately, the extent of HIV infections in adolescents has been underrecognized due to the clinical latency period whereby most infected individuals remain asymptomatic for at least several years before the onset of AIDS-related illnesses. Furthermore, those adolescents at highest risk for HIV infection are least likely to present for routine medical visits and are most difficult for health care providers to reach.

Recent advances in antiretroviral therapies have demonstrated the importance of treatment early in the course of disease. In addition to medical therapies, HIV-infected adolescents need support services, including case management, and risk reduction counselling. As a result, early diagnosis of HIV-infected adolescents is a greater priority than ever before.

Adolescent AIDS In The United States and Rhode Island

Through June, 1996, a cumulative total of 2574 AIDS cases among adolescents 13 to 19 years were reported in the United States - 0.5% of all cases. (CDC, 1996)[1] For the same period, the cumulative number of AIDS cases in young adults 20 to 24 years of age was 19,997, the majority of whom are assumed to have been infected in adolescence, given the clinical latency period from HIV infections to AIDS of approximately 10 years.[1] The number of cases in the 25 to 29 year old age group was 78,031, a substantial portion of whom are likely to have been infected during adolescence. The 100,602 AIDS cases for the 13 to 29 year old age group constitute nearly 20% of all AIDS cases in the United States.

The Rhode Island Department of Health (RIDOH) also mandates confidential AIDS reporting in addition to anonymous reporting of HIV-positive tests. The percentages of AIDS cases in adolescents and young adults by age group in Rhode Island are similar to the U.S. percentages (Table 1). Through 1995, only 5 cases of AIDS were reported in persons 13-19 years of age (0.4% of all AIDS cases in the state).[3] However, given the long incubation period from primary HIV infection to AIDS, this number presumably underestimates the number of HIV-infected adolescents in Rhode Island. Through 1995, 271 cases of AIDS were reported in persons 20-29 years of age (nearly 20% of the cumulative total of Rhode Island AIDS cases). Many of these patients probably acquired HIV infection during their teens. However, for persons ages 13-19 years, only 26 HIV positive tests were reported to the RIDOH through 1995 (1% of all cumulative positive tests for the state). The number of HIV positive tests reported for Rhode Island adolescents is probably a significant underestimate of those who have become infected during adolescence. These data strongly suggest that HIV infection, while occurring in adolescents, is often not identified until these individuals are older.

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
CDC	Centers for Disease Control and Prevention
HIV	Human immunodeficiency virus
IDU	Injection drug use
RIDOH	Rhode Island Department of Health
STD	Sexually transmitted disease

Table 1

Number of AIDS Cases of total Cases (%)

Age Group	Rhode Island*	United States**
13-19	5 (0.4)	2574 (0.5)
20-29	271 (19.6)	19,997 (17.9)

*RI data, through 1995 (reference 3)

**US data, through 1996 (reference 2)

Several possible explanations may account for the apparent under-identification of HIV-infected adolescents in Rhode Island. These include decreased testing rates in adolescents in general, and a lack of HIV testing for those adolescents at highest risk for infection, such as young persons of color, out-of-school youth, young gay men, substance abusing and homeless youth. In general, these high risk adolescents have fewer points of contact with the health care system and therefore are less likely to be tested for HIV.

Populations of Adolescents at Increased Risk For HIV (Table 2)

AIDS disproportionately affects young people of color. Among persons 13-29 years of age in Rhode Island with AIDS, 39% have been African American or Latino; 61% have been Caucasian.[4] Twenty-six % have been female; 74%, male. Certain groups of adolescents are at particularly high-risk for HIV infection due to behaviors directly or indirectly associated with the acquisition of HIV infection: adolescents who are homosexual, substance abusing, homeless/runaway and incarcer-

Table 2

Adolescents at High Risk for HIV Infection

- Black and Latino Adolescents
- Young Men Who Have Sex With Men
- Injection Drug Users
- Crack Cocaine Users
- Homeless Adolescents
- Incarcerated Adolescents
- History of Any STD, including Genital HSV

ated. Adolescents may belong to more than one high risk group.

Young men who have sex with men continue to have a high incidence of HIV infection in the United States.[5] Unsafe sexual practices, especially unprotected anal intercourse, have continued to place young gay men at increased risk for HIV infection. Gay adolescent males may lack knowledge about safe sexual behavior and the skills to negotiate for condom-protected sex. Health care providers also must recognize that many male adolescents do not identify themselves as "gay" and therefore must be asked specifically about same-sex sexual behaviors in assessing for HIV risk.

Substance-abusing youth are at high risk for HIV infection, particularly if they have used injection drugs.[6] Sharing needles, syringes or other injecting equipment places these adolescents at particularly high risk. Crack-cocaine use also increases HIV risk, primarily because crack use is associated with high rates of unprotected sex with multiple sexual partners, and the frequent exchange of sex for drugs.

Homeless or runaway youth are known to be at high risk for HIV infection.[7] Many of these adolescents, due to their precarious life situations, have engaged in unprotected survival sex (the exchange of sex for a place to stay, food or money). In addition, many homeless adolescents have other risk behaviors for HIV, including injection drug use (IDU), crack-cocaine use and sex with partners known to be at high risk for HIV.

Populations of youth who have been incarcerated in jails or prisons engage in HIV-risk behaviors at high rates .[7] These adolescents have often initiated sexual activity in their early teenage years and report multiple recent partners. Many report a history of substance use, especially those incarcerated on drug-related charges.

Multiple HIV serosurveys of adolescents attending STD clinics have found that adolescents with a history of *any* sexually transmitted disease (STD) are at increased risk for HIV infection.[7] STDs are very common in adolescents. In 1995, 65% of all STDs reported to the RIDOH occurred in persons 15 -24 years of age.[3] While many STDs such as chlamydia, gonorrhea and syphilis are treatable, they are indirect markers for HIV risk. Some STDs, such as genital ulcer disease, including genital herpes infection, directly increase HIV transmission and susceptibility to new infections. Any adolescent reporting a history of an STD should also be tested for HIV.

... data strongly suggest that HIV infection, while occurring in adolescents, is often not identified until these individuals are older.

While these high risk groups of adolescents deserve special consideration for HIV counselling and testing, many adolescents who acquire HIV infection report none of the traditional high risk factors (i.e., men who have sex with men, injection drug use, sexual contact with persons at high risk, and blood, or blood product recipients). According to CDC data through 1995, 16% of all women ages 15-24 with AIDS reported no specific risk factor for acquisition of HIV.[2] This suggests that a high proportion of women with HIV infection were not aware of having a sexual partner at risk for HIV. Therefore, HIV testing should be offered to any adolescent reporting multiple partners and/or unprotected sex.

HIV Testing and Education for Adolescents (Table 3)

Since HIV infection in adolescents is likely under-identified, and HIV risk behaviors are commonplace in the lives of many adolescents, health care providers should incorporate HIV counselling and testing into their routines. In Rhode Island, adolescents under 18 years of age may legally consent to HIV testing without parental consent.[8] Some features of adolescent testing deserve special emphasis.[9] When testing adolescents for HIV infection, providers should always explain the meaning, potential benefit and risks of HIV testing in a manner appropriate to the cultural background and cognitive level of the individual young person. This helps to ensure that the adolescent can provide truly informed consent for testing. Confidentiality should be assured and clarification given as to who will have access to the test results. Pre- and post-test counselling should always be given, providing a valuable opportunity to offer adolescents HIV-related knowledge, personal risk behavior assessment and the reinforcement of specific HIV prevention skills. During pre-test counselling, assessing whether an adolescent is mentally and emotionally prepared to learn their HIV serostatus, and how he or she may react to HIV test results is particularly important. For example, some adolescents may not be emotionally ready to be tested if a positive result could trigger self-destructive impulses or suicidal thoughts. Assessment of the adequacy of social support is also important in the event of a positive test. Each adolescent should be helped to identify a supportive parent

Table 3

Barriers to HIV Testing and HIV Care for Adolescents

- Feelings of invulnerability
- Denial/apathy
- Orientation towards the present
- Lack of knowledge of services
- Lack skills to access services
- Lack of free services
- Issues of confidentiality
- Inconvenient hours of operation

or other adult in the process of testing and follow-up care. If the adolescent cannot identify a supportive adult, the testing agency should identify one. In the case of adolescents, positive or negative test results should always be given in person. Counselling and testing is best located in a setting from which the adolescent can be easily linked to HIV/AIDS medical care and mental health services.

Health care providers should understand the many barriers adolescents may need to overcome to obtain HIV testing and clinical care, and social services. Some barriers pertain to adolescents' attitudes towards HIV infection and AIDS. These may include feelings of invulnerability such as: "HIV infection might happen to other people, but it could never happen to me." Other youth, despite having acquired factual knowledge about HIV and AIDS, may be in denial about their own behaviors which have placed them at risk for infection. These adolescents may not appreciate the need for HIV testing. Adolescents may be apathetic toward testing, believing that nothing can be done for them in the event of a positive test. Finally, young people, who generally are more present-oriented than adults, tend to think less about possible long-term health consequences of their decisions. This is especially true for youth living "on the street," struggling with basic survival, and for whom health care and HIV screening are understandably of low priority.

Other barriers to HIV testing and services relate to adolescents' access to institutions which provide HIV-related services. Young people may lack knowledge of the agencies that provide HIV-related services, such as the counselling and testing sites within their communities. Moreover, many youths lack the skills to access such services. In order for services to be "adolescent friendly," they need to be available free-of-charge, during convenient after-school hours.

Prevention

Until an effective HIV vaccine is developed, efforts to modify behavior to decrease the risk of HIV infection will remain the foundation of HIV prevention. Sexual abstinence should be endorsed as a valid option for teenagers. While abstinence is the only way to guarantee safe sex, studies have shown that sexually active adolescents rarely revert to abstinence. Therefore, teaching adolescents about safe-sex skills, such as proper use of condoms, refusal skills, and how to negotiate for condom use, is necessary if the goal is to prevent HIV and other STDs. Information in and of itself does not appear to be sufficient to reduce HIV risk behavior in adolescents. However, several studies have demonstrated that HIV-related high risk behaviors can be reduced in adolescents at risk for HIV. Several randomized-controlled trials of skills-based HIV behavioral interventions in youths at risk have demonstrated efficacy in reducing the number of sexual partners and increasing consistent use of condoms.[10] Similar studies now must be designed to target those adolescents at highest risk for HIV such as previously incarcerated, substance-abusing and gay youth.

References

1. Rosenberg PS, Biggar RJ, Goedert JJ. Declining Age At HIV Infection in the United States. *NEJM* 1994; 330: 789-780.
2. HIV/AIDS Surveillance Report, Vol. 8, No. 1, CDC; 1996
3. Rhode Island Department of Health Office of AIDS/STD. *Morbidity and Mortality Report,* Summer, 1996.
4. Rhode Island Department of Health data, 1996.
5. Kegeles SM, Hays RB, Coates TJ. The Mpowerment Project: A Community-Level HIV Prevention Intervention for Young Gay Men. *Am J Public Health* 1996;86:1129-1136.
6. Vermund SH, Hein K, Gayle HD, et al. Acquired Immunodeficiency Syndrome Among Adolescents. Case Surveillance Profiles in New York City and the Rest of the United States. *AJDC* 1989;143:1220-1225.
7. Sweeney P, Lundegren ML, Buehler JW, et al. Teenagers at Risk of Human Immunodeficiency Virus Type 1 Infection. *Arch Pediatr Adolesc Med* 1995;149:521-528.
8. Recommendations for Counseling and Testing Adolescents for HIV Infection. Committee on Testing Mirrors for HIV Without Parental Consent. Rhode Island Department of Health, 1991.
9. Futterman D, Hein K. In: Pizzo PA, Wilfert CM, ed. *Pediatric AIDS: The Challenge of HIV Infection in Infants, Children and Adolescents*, 2nd ed. Baltimore, MD: Williams & Wilkins; 1994; 40: 757-772.
10. NIH Consensus Conference on Interventions to Prevent HIV Risk Behavior, Bethesda, MD, February 11-13, 1997

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The Miriam Hospital, *in collaboration with FACTS (Family AIDS Center for Treatment and Support), has established a medical clinic to meet the needs of HIV-infected adolescents and young adults. The clinic also provides free, confidential HIV counseling and testing. For referrals or further information, please call: 351-7330, and ask for the ADAMS clinic.*

Human Immunodeficiency Virus Infection and Sexually Transmitted Diseases

Susan Cu Uvin, MD, and Timothy P. Flanigan, MD

Human immunodeficiency virus (HIV) infection is a sexually transmitted disease (STD). The most common mode of HIV transmission globally is through heterosexual sex.[1] HIV affects men and women who are sexually active and who are also at risk for other STDs.

Other STDs may play a role in the transmission and acquisition of HIV. There is a reciprocal impact of HIV on the natural history and response to therapy of STDs. Understanding the role of STDs in the progression of HIV disease and the role of HIV in the alterations of the natural history, diagnosis, or response to therapy of STDs is critical to HIV control and prevention. If HIV infection enhances the infectivity of other STDs and decreases the efficacy of current antimicrobial treatments, and if the same STDs facilitate HIV transmission, each infection may amplify each other. This "epidemiologic synergy" of HIV and STDs may be responsible for the explosive growth of the HIV pandemic in some populations.[2]

Several reports have shown increased prevalence and incidence of STDs among HIV-infected women. In a study of 244 HIV-infected women, Clark et al found that STDs were common: 22% had syphilis, 7.2% had N. gonorrhea, 12.3% had chlamydia trachomatis, 26.9% had trichomoniasis, and 16.5% had herpes simplex ulcers.[3] Another study of 212 HIV-infected female drug users with a history of prostitution showed significantly increased risk for gonorrhea, trichomoniasis, candida vaginitis, genital warts, and genital ulcers compared to HIV-uninfected drug-using prostitutes.[4]

The HERS (HIV Epidemiologic Research Study), an ongoing prospective study on the natural history of HIV in women, has enrolled 871 HIV-infected and 439 HIV-uninfected high risk women with similar demographic and behavioral characteristics. The study found no significant difference in the prevalence of lower genital tract infections between these two groups. The most common infections diagnosed were bacterial vaginosis (34%) and trichomoniasis (12%). Gonorrhea was <1%, chlamydia 4%, syphilis 8% and candida vaginitis 3%.[5]

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
CDC	Centers for Disease Control and Prevention
HERS	HIV Epidemiological Research Study
HIV	Human immunodeficiency virus
HPV	Human papillomavirus
HSV	Herpes simplex virus
STD	Sexually transmitted disease

If HIV enhances the infectivity of other STDs and decreases the efficacy of current antimicrobial treatments, and if the same STDs facilitate HIV transmission, each infection may amplify the other.

Ulcerative STDs

Several studies have repeatedly shown that STDs, particularly genital ulcer disease, increase the risk of transmission and acquisition of HIV[6] - plausibly from breaks in the mucosa or skin, providing a portal of entry for the virus. The ulcer may harbor target cells for HIV, both CD4 cells and lymphocytes which may be activated in the setting of STDs.

Syphilis

A study of prostitutes in Nairobi, Kenya, found an association between syphilis and HIV seropositivity.[7] In the US, a study in Baltimore STD clinics showed a strong correlation between positive serologic test for syphilis or history of syphilis with HIV infection.[8]

There are conflicting conclusions regarding the presentation, accuracy of diagnostic tests and response to therapy among HIV-infected patients with syphilis.[9] Case reports of HIV-infected persons have documented the appearance of neurosyphilis and meningovascular complications despite "appropriate" treatment. However, other studies have shown no difference in cerebrospinal fluid protein levels, nontreponemal tests, stage of disease, clinical manifestations or response to therapy in the 2 groups.[10]

Biologic false positive nontreponemal tests may be more common among HIV-positive persons. However, serologic tests for syphilis appear to be accurate except for those with advanced immunosuppression.

Specific treponemal tests can differentiate reactivity due to syphilis from biologic false positive tests.[10]

To treat primary or secondary syphilis among HIV-infected patients, the CDC recommends benzathine penicillin G 2.4 M units intramuscularly. Although adequate research-based evidence is not available, because of published case reports suggesting HIV-infected patients with early syphilis are at increased risk for neurologic complications and have higher rates of treatment failures, some experts recommend multiple doses of benzathine penicillin G or other supplemental antibiotics. HIV-infected patients who have latent syphilis (regardless of apparent duration) should undergo cerebrospinal fluid examination before treatment with benzathine penicillin G 7.2 M units (as 3 weekly doses of 2.4 M units each). Patients with neurosyphilis should receive 12-24 M units of aqueous crystalline penicillin G daily, administered as 2-4 M units q 4 hours, for 10-14 days.

Closer follow-up is recommended for HIV-infected persons. Patients should be evaluated clinically and serologically for treatment failure at 1 month and at 2, 3, 6, 9, and 12 months after therapy.[11]

Herpes Simplex Virus Type 2 (HSV-2)

An association between HSV and HIV infection was found among a group of homosexual men presenting with acute proctitis.[12] Among heterosexual men and women in Baltimore, there was an association between HSV-2 antibody positivity and HIV seropositivity.[13]

In HIV-infected patients, unusually severe herpetic lesions have been recognized, especially in those with advanced immunosuppression.[14] Slow healing ulcers of >1 month duration have been included among the CDC AIDS defining diagnosis.

The CDC recommendation for first clinical episode of genital herpes is acyclovir 400 mg orally 3-5x a day for 7-10 days or until clinical resolution is attained. For herpes proctitis, acyclovir 400 mg orally 5x/day for 10 days or until clinical resolution. For severe disease, intravenous acyclovir (5-10 mg/kg body weight every 8 hours for 5-7 days or until clinical resolution is attained) therapy may be required. If lesions persist, resistance to acyclovir should be suspected. Foscarnet, 40mg/kg body weight IV every 8 hours until clinical resolution is attained, appears to be the best available treatment. Daily suppressive therapy may reduce the frequency of HSV recurrences. The recommended regimen is acyclovir 400 mg orally twice a day.[11]

Table I
Diagnosis and Treatment for STDs in HIV-infected Persons

Infection	Diagnosis	Treatment
Vaginitis		
Candidiasis	KOH mount Culture: Nickerson's media	Topical butaconazole, clotrimazole, miconazole, nystatin, terconazole, or tioconazole
Trichomoniasis	Saline microscopy, culture	Metronidazole 2.0g PO
Bacterial vaginosis	Saline microscopy Whiff test, Gram's stain	Metronidazole 500mg PO b.i.d. x 7 days
Gonorrhea	Gram's stain Culture: Thayer-Martin	Ceftriaxone 125 IM once or spectinomycin 2g IM once
Chlamydia	Culture: McCoy cells DNA amplification tests	Doxycycline 100mg PO b.i.d. x 7 days Azithromycin 1gm PO single dose
Herpes simplex	Viral culture Antigen detection Tzanck smear	Acyclovir 400mg PO 3-5x/day for 10 days
Severe cases		Acyclovir 5mg/kg IV q8h x 7 days
Suppression		Acyclovir 400mg PO b.i.d.
Human papillomavirus infection	Cytology Histology DNA hybridization, PCR	Podophyllin, trichloroacetic acid, cryotherapy, laser therapy, electrocautery, 5-fluorouracil
Syphilis	Darkfield microscopy RPR, VDRL, FTA-ABS, MHA-TP	
Early		Benzathine penicillin G 2.4 million units IM once
Late		Benzathine penicillin G 2.4 million units IM weekly x3
Neurosyphilis	Cerebrospinal fluid examination	Aqueous crystalline penicillin G, 12-24 million units IV daily for 10-14 days
Chancroid	Culture	Erythromycin 500mg PO 4x/day for 7 days

Chancroid

Chancroid is the most common genital ulcer in Africa and plays a dominant role in developing countries. It is also endemic in some areas of the U.S. A study from Kenya demonstrates an association between genital ulcer disease and risk of HIV seroconversion.[6] Chancroid has been well established as a co-factor for HIV transmission; a high rate of HIV infection among patients with chancroid has been reported in the U.S.[11]

Some data suggest that the effectiveness of short-term, single-dose antibiotics may have impaired effectiveness in HIV-infected patients with chancroid. These patients may require longer courses of therapy. Healing may also be slower. Some experts suggest using erythromycin 500 mg 4x a day for 7 days instead of azithromycin 1 g oral single dose or ceftriaxone 250 mg 1M single dose.[11]

Non-Ulcerative STDs

Gonorrhea

Gonococcal infection has been found to be significantly associated with HIV infection in female prostitutes in Kinshasa, Zaire.[15] No reports have suggested a need to change therapy in HIV-infected patients with gonorrhea. Recommended treatment for uncomplicated gonococcal infections is ceftriaxone 125 mg 1M single dose.[11]

Chlamydia

A report from Italy showed that HIV-positive women (13.3%) have significantly higher rates of asymptomatic genito-urinary chlamydia trachomatis compared to HIV negative controls (8%) and women of unknown HIV status (6%).[16]

No data indicates that HIV infection alters the presentation or response to therapy of chlamydia. Recommended treatment is Doxycycline 100 mg orally 2x a day for 7 days or azithromycin 1 gm orally in a single dose.11

Vaginitis

Candida vaginitis and bacterial vaginosis are not considered sexually transmitted diseases. However, they cause changes in the normal flora of the genital tract and may affect HIV transmission.

An early report indicated that 24% of HIV-infected women followed at Walter Reed Army Medical Center had a history of unexplained chronic vaginal candidiasis for at least one year.[17] Recurrent vaginal candidiasis (38%) was the most common initial clinical manifestation of HIV infection in a cohort of HIV-infected women in Rhode Island.[18] In a study of 605 pregnant HIV-infected women, women with low CD4 counts (<200) had a two-to-fivefold increased likelihood of vaginal colonization and vaginal candidiasis.[19] The treatment of candida vaginitis in HIV-infected women is similar to HIV-uninfected women.

Bacterial vaginosis was independently associated with HIV seroprevalence in a cross-sectional study of 144 female commercial sex workers in Thailand.[20] Recommended treatment is metronidazole 500 mg orally 2x a day for 7 days. Patients should be advised to avoid using alcohol during treatment and for 24 hours thereafter. Alternative treatments are clindamycin cream 2% 5g intravaginally for 7 days or metronidazole gel 0.75% 5gm intravaginally 2x a day for 5 days.[11]

There have been no reports on the impact of HIV on the presentation and response to treatment of trichomonas infections. Recommended therapy is metronidazole 2 gm orally in a single dose or 500 mg 2x a day for 7 days. Sex partners should be treated.[11]

Even if nonulcerative infections have been less implicated in HIV transmission/acquisition than the classic STDs, they may play a substantial role in heterosexual transmission of HIV because they are more prevalent.

Human Papillomavirus (HPV)

There is an increased prevalence of cervicovaginal infection with HPV among HIV-infected patients.[10] Numerous reports have suggested that HIV and HPV act synergistically to induce cervical neoplasia. The reported frequency of abnormal Papanicolaou smears in HIV-infected women ranges from 31% to 50%. There have been some case reports of rapid progression of cervical neoplasia to cervical cancer and increased resistance to standard treatment. These have not been validated by other studies.[10] Cervical cancer has been added by the CDC as an AIDS defining condition.

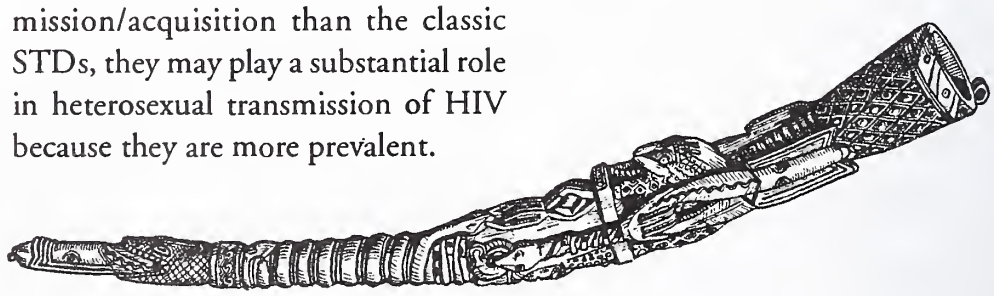
HIV-infected women should have a Pap smear on initial medical evaluation. If the initial Pap smear is normal, an additional smear should be done in 6 months. If the repeat smear is normal, she should have annual Pap smears.[11]

If the initial Pap smear shows severe inflammation, another Pap smear should be done within 3 months.

Any woman with Pap smear with atypical squamous cells, or squamous intraepithelial neoplasia should be referred for colposcopy and have colposcopically directed biopsies as necessary.

HIV infection is not an indication for colposcopy among women with normal Pap smears.[11]

The management of gynecologic complications in HIV-infected persons involves special challenges. As we learn more about HIV infection, we unravel the associations between HIV and other STDs. It is essential that physicians evaluate, diagnose, and treat for concomittant STDs in HIV-infected persons as part of their routine medical care.



References:

1. Chin J, Sato PA, Mann JM. Projections of HIV infections and AIDS cases to the year 2000. *Bull World Health Organ* 1990; 68:1-11.
2. Wasserheit JN. Epidemiological synnergy: Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. *Sex Trans Dis* 1992;19:61.
3. Clark RA, Brandon W, Dumestre J, et al. Clinical manifestations of infection with human immunodeficiency virus in women in Louisiana. *Clin Infect Dis* 1993;17:165.
4. Fennema JSA, van Ameijden EJC, Coutinho RA, et al. Human immunodeficiency virus, sexually transmitted diseases and gynecologic disorders in women: increased risk for genital herpes and warts among HIV-infected prostitutes in Amsterdam. *AIDS* 1995; 9:1071.
5. Cu Uvin S, Warren D, Mayer KH, et al. Prevalence of genital tract infections in HIV-seropositive and high risk seronegative women. (Abstract WEB 3189) XI International Conference on AIDS, Vancouver, Canada, 1996:89.
6. Plourde PJ, Ronald AR. Synergies between human immunodeficiency virus infection and other sexually transmitted diseases. Opportunistic complications of HIV 1995; 4:3.
7. Kreiss JK, Koech D, Plummer FA, et al. Acquired immunodeficiency virus syndrome infection in Nairobi prostitutes: spread of the epidemic to East Africa. *N Engl J Med* 1986;314:414.
8. Quinn T, Glasser D, Canon R, et al. Human immunodeficiency virus infection among patients attending clinics for sexually transmitted diseases. *N Engl J Med* 1988;318:197.
9. Augenbraun MH, McCormack WM. Sexually transmitted diseases in HIV-infected persons. *Inf Dis Cl North Am* 1994; 8:439.
10. Cellum C. Diagnosis and treatment of sexually transmitted diseases in HIV-infected women. Cotton D, Watts DH, eds: *The Medical Management of AIDS in Women*. New York, Wiley-Liss, 1997.
11. Centers for Disease Control. 1993 Sexually transmitted disease treatment guidelines. *MMWR* 1993; 42:19-91.
12. Stam W, Handsfield H, Rompalo A, et al. The association between genital ulcer disease and acquisition of human immunodeficiency virus infection in homosexual men. *JAMA* 1988; 260:1429.
13. Hook E III, Cannon R, Nahmias A, et al. Herpes simplex virus infection as a risk factor for human immunodeficiency virus infection in heterosexuals. *J Infect Dis* 1992; 165:251.
14. Bagdades E, Pillay D, Squire S, et al. Relationship between herpes simplex virus ulceration and CD4 cell counts in patients with human immunodeficiency virus infections. *AIDS* 1992; 6:1317.
15. Laga M, Manoka A, Kivuvu M, et al. Non-ulcerative sexually transmitted diseases as risk factors for human immunodeficiency virus transmission in women: Results from a cohort study. *AIDS* 1993; 7:95.
16. Spinillo A, Giovanna G, Regazetti A, et al. Asymptomatic genitourinary chlamydia trachomatis infection in women seropositive for human immunodeficiency virus infection. *Obstet Gynecol* 1994; 83:1005.
17. Rhoads JL, Wright C, Redfield RR, et al. Chronic vaginal candidiasis in women with human immunodeficiency virus infection. *JAMA* 1987; 257:3105.
18. Carpenter CCJ, Mayer KH, Stein M, et al. HIV infection in North American Women: experience with 200 cases and review of literature. *Medicine* 1991; 70:307.
19. Burns D, Tuomala R, Chang BH, et al. Vaginal colonization or infection with candida albicans in HIV-infected women during pregnancy and during postpartum period. *Clin Infect Dis* 1997; 24:2001.
20. Cohen C, Duerr A, Pruithithada N, et al. Bacterial vaginosis and HIV seroprevalence among female commercial sex workers in Chang Mai, Thailand. *AIDS* 1995; 9:1093.

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Three Decades of Research on Sexual Behavior and Sexually Transmitted Pathogens in College Students

Stephen H. Zinner, MD, and William M. McCormack, MD

Over the past quarter century, there has been a veritable explosion of interest in sexually transmitted diseases (STDs). In 1972, the first Infectious Diseases Pathophysiology Course at the newly formed Brown University School of Medicine discussed only two STDs, syphilis and gonorrhea. Genital herpes infection received a brief mention. Since those days, hardly ancient history, we have learned that over 30 distinct microorganisms including bacteria, viruses, fungi, protozoa and ectoparasites can be spread sexually. Despite these dramatic changes and the emergence of a life-threatening STD — HIV — as well as the tremendous publicity associated with AIDS, genital herpes, chlamydial infections, etc., until recently there has been relatively little documented change in sexual practices in most populations.

In 1972, we began an ongoing collaborative effort. We first correlated anonymous self-reported sexual behavioral data with the prevalence of genital mycoplasma in men.1 This was the first large scale study of sexual behavior in Rhode Island; it involved male students at Brown University and the University of Rhode Island. The ability to perform studies of such a personal and confidential nature was due in large part to the cooperation of the Directors of the Health Services at the two Universities and to the development of a confidential anonymous questionnaire with enough internal validators to enhance the reliability of the self-reported data.

Abbreviations Used:

AIDS	Acquired immune deficiency syndrome
HIV	Human immunodeficiency virus
STD	Sexually transmitted disease

Studies of Genital Microflora

In this first study cultures (for genital mycoplasmas) were obtained from the urine urethral meatus and coronal sulcus of 191 participants who also completed an anonymous, confidential sexual history questionnaire. Specimens and questionnaires were identified by number only. The prevalence of T-mycoplasmas, now known as *Ureaplasma urealyticum*, was clearly related to sexual experience in this sample. These organisms were isolated from 6 of 32 men (19%) who had had sexual intercourse with a single female partner, in 17 of 42 (41%) who reported 3-4 lifetime sexual partners, and in 21 of 45 (47%) men who reported over 6 lifetime sexual partners. In addition, ureaplasma colonization rates were considerably higher for the men who seldom or never used condoms than for those who always or almost always used condoms (45 of 105, 43% vs. 5 or 35, 14%, P<0.01).[1] Although in those days the genital mycoplasma were agents in search of a disease, it is well known today that these agents are involved in urethritis and postpartum fever, as well as other conditions. Note that fewer than 25% of these college men reported condom use in 1973!

Another study in 143 college men and in 209 clinic patients compared several available methods to culture genital mycoplamas.[2] Urethral swabs were performed with calcium alginate and cotton-tipped swabs and cultures also were obtained from the coronal sulcus and urine. Urethral swab cultures (using either device) were most effective in isolating *U. urealyticum*, an organism found more frequently in uncircumcised men.[2] Coronal cultures were somewhat more effective than urethral or urine cultures in isolating *M. hominis*.

In 1973 we also tested the hypothesis that tampons might be used for the self-culture and screening for *N. gonorrhoeae* in college women. Manila envelopes containing a tampon, a plastic container and instructions were given to 3,575 university women. Only 582 (16%) submitted a tampon for culture. These cultures yielded no gonococci, but *U. urealyticum* was isolated from 53% and *Mycoplasma hominis* from 12%. This study suggested that screening studies in college women might benefit from considerable advance publicity to increase participation. Although gonococci were not found, the use of a self-administered tampon to screen for genital organisms

Table 1

Rates of Isolation of Genital Organisms from Healthy College Students (4-11)

Organism	Sexually Inexperienced	Sexually Experienced
U. urealyticum (men)	0%	19-56%*
U. urealyticum (women)	19%	39-82%*
M. hominis (men)	0%	4-14%*
M. hominis (women)	8.5%	7-33%*
Group B Streptococcus (women)	20%	17-26%
Gardnerella vaginalis (women)	29%	23-41%*
Chlamydia trachomatis (isolated)	0	3-17%*
C. trachomatis (cervical antibody)	0	4-37%*
Neisseria gonorrhoeae (women)	0	0.5%

* increasing rates with increasing lifetime number of sexual partners

Table 2
Self-Reported Condom Use* during Sexual Intercourse in College Women (12, 13)

1975	1986	1989	1995
49/427 (11%)	30/140 (21%)	46/113 (41%)	87/118 (74%)

* "always or almost always"

was established.[3]

By 1974, genital herpes was being seen with increasing frequency and tests were being developed for the detection of *Chlamydia trachomatis*. At this time we added questions more relevant to women and enlisted the aid of Drs. Roswell Johnson and John Evrard and subsequently Drs. Sumner Hoffman and Marlene Eckerle at the Brown University Student Health services to undertake the first correlative study of sexual behavior and the presence of genital pathogens in college women. Five hundred women who presented to a health services gynecologist for any reason (usually for annual cytological examinations or fertility control) completed a confidential questionnaire that dealt with sexual history and specific practices, condom use, contraceptive methods, antibiotic use and genital tract symptoms. During a gynecological examination, four vaginal specimens were obtained using sterile cotton-tipped swabs. These specimens were cultured and/or examined for *Corynebacterium vaginale* (now *Gardnerella vaginalis*), *Candida albicans, Mycoplasma hominis, Ureaplasma urealyticum, Trichomonas vaginalis, Neisseria gonorrhoeae*, group B streptococcus (*Streptococcus agalactiae*), and *Chlamydia trachomatis* (using culture and antibody detection methods).4-11

A series of papers described the relation of increased sexual activity (numbers of different sexual partners) to increasing prevalence of many sexually transmitted pathogens (Table 1).[4-11] With Carol Baker we showed that vaginal Group B Streptococcus was present in about 20% of these women.[4] Using logistic regression analysis, four factors were significantly associated with this organism including presence of an intrauterine device, sexual experience, obtaining cultures during the first half of the menstrual cycle and age less than 20 years. The presence of Group B Streptococcus was not related to specific sexual practices, symptoms, antibiotic use, history of sexually transmitted disease, race or pregnancy or marital history.[4] On the other hand, sexual experience had little effect on colonization with *Gardnerella vaginalis*, but race, use of oral contraceptives and a history of pregnancy but not marriage did influence colonization rates.[5]

Chlamydia trachomatis is known to be among the most widely distributed of the sexually transmitted pathogens and has been implicated as the agent behind the "silent" epidemic.

Chlamydia trachomatis is known to be among the most widely distributed of the sexually transmitted pathogens and has been implicated as the agent behind the "silent" epidemic. Our studies in college women were among the first to relate increasing cervical colonization rates with increasing numbers of lifetime sexual partners. For example, chlamydial antibodies were found in cervical secretions of 14 of 42 (33%) women with 6 or more different lifetime sexual partners and in none of 22 women without histories of vaginal penetration.[6] Fifteen to 25 months after the initial examination, 25 of the 62 women with evidence of vaginal chlamydial colonization (by culture or antibody detection) were re- evaluated for chlamydial presence. None of 11 women who had taken antibiotics known to be effective against *Chlamydia trachomatis* were infected at followup, but 7 of 14 women who did not receive antibiotics were still infected.[7] Most were asymptomatic. This study was among the first to show that chlamydia can persist in the genital tract for many months even in the absence of symptoms or signs of infection.

Chlamydial infection was less common in women who used barrier contraceptives (condoms, diaphragms) and colonization with other genital organisms including *M. hominis* , *U. urealyticum* , and *Trichomonas vaginalis* was more frequent in women who were infected with chlamydiae.[9]

Similar to men, vaginal colonization with the genital mycoplasma increased with increasing numbers of sexual partners in those women who did not use barrier methods of contraception.[10] In this population, gonorrhea was not common (Table 1) and no cases of syphilis were detected.[8] Genital warts, genital herpes, molluscum contagiosum were noted on examination in fewer than 1-2% of these college women.[8] Vaginal colonization with yeasts as determined by microscopy and culture of vaginal secretions was detected in 27-33% of college women at the health services; these findings correlated with the presence of abnormal volume of vaginal discharge and with vulvovaginal itching.11

Studies of Sexual Behavior

The same questionnaire administered to 500 women in 1974-1975 was used in three subsequent surveys on the same campus.12-13 Participants were not subjected to vaginal or cervical examinations or cultures. A total of 161 women were studied in 1986, 132 in 1989 and 147 in 1995 (in collaboration with Dr. Jeffrey Peipert and colleagues). This questionnaire included detailed questions about demographic factors, numbers of partners, frequency of specific sexual practices, gynecological symptoms, contraceptive practices and condom use, as well as the question: "When you have intercourse how often does your partner use a condom?" In 1989, participants also were asked about HIV awareness (in collaboration with Drs. Barbara DeBuono and Maxim Daamen).

Several findings from these surveys warrant comment.

First, despite the introduction of many well-publicized sexually transmit-

ted diseases, including genital herpes and HIV, sexual behavior in college women as measured by the frequency of specific sexual practices and numbers of sexual partners has not changed from 1974 to 1995. Similar numbers of students in each of the survey years reported 6 or more lifetime sexual partners (22%, 20% and 21% for 1975, 1986 and 1989, respectively) and 3 or more different sexual partners during the previous year of the study (22,19, 21 %, respectively). The age, age of menarche, gravidity, level of education of the participants were similar for all study years, but there were more Asians and non-whites in the later years, reflecting the changing composition of the student body.

Rates of specific sexual practices did not change significantly over the study years: fellatio (regularly performed by 33%, 34%, 42%, respectively), cunnilingus (regularly performed by 24%, 24%, and 29%, respectively), and anal intercourse (occasionally perfomed by 10%, 8%, and 8%, respectively) over the first 3 surveys. Other public health measures did influence the frequency of smoking and tampon use.[12]

Self-reported condom use has increased (Table 2): 11% of women reported conddom use in 1975, 21% in 1986, 41% in 1989, and 74% in 1995. These data are in contrast to studies in other young populations which suggest that consistent condom use is only reported in about 22% of sexually active heterosexual persons,[14] although the CDC recently reported results from a study of 1,793 inner-city women in 5 cities participating in a HIV prevention counseling trial. Consistent condom use increased from 13% at enrollment to 36% at follow-up.[15]

HIV / AIDS awareness was high in these students (assessed in 1989 and 1995), although 22% of women admittec to more risky sexual behavior when they were seriously involved with a partner. It is likely that fear or perceived risk of HIV impacted on their increasing use of condoms.

Comment

Over the past three decades, considerable information has been gleaned from studies in college students. The increasing use of condoms during sexual intercourse is indeed encouraging, as are the relatively low rates of clinically detected sexually transmitted diseases. The universities in question have met the STD epidemic with vigorous and effective sex education. The cooperation of the university health services in permitting and encouraging participation in behavioral and microbiological research studies has been essential to these efforts and is greatly appreciated. The importance of confidentiality in these types of studies cannot be overemphasized. Methods to ensure anonymity and confidentiality are essential to the success of these efforts, and it is imperative that students have a non-prejudicial free choice regarding their participation. With these caveats, it is likely that studies in college students will continue to be feasible and fruitful. It is also important to note that the results described here do not apply to other higher risk segments of our population - areas where future preventive efforts must be directed.

References

1. McCormack, WM, Lee, Y-H, Zinner, SH. Sexual experience and urethral colonization with genital mycoplasmas. *Ann Intern Med* 1973;78:696-698.
2. Tarr PI, Lee Y-H, Alpert S, et al. Comparison of methods for the isolation of genital mycoplasmas from men. *J Infect Dis* 1976;133:419-423.
3. McCormack WM, Alpert S, Crockett VA, and Zinner SH. Evaluation of self-obtained cultures using a vaginal tampon as a method of screening for asymptomatic gonorrhea on a college campus. *J Am Vener Dis Assoc* 1974;1:85-87.
4. Baker CJ, Goroff DK, Alpert S, et al. Vaginal colonization with group B *Streptococcus*: A study in college women. *J Infect Dis* 1977;135:392-397.
5. McCormack WM, Hayes, CH, Rosner B, et al. Vaginal colonization with *Corynebacterium vaginale* (*Haemo-philus vaginalis*). *J Infect Dis* 1977; 136:740-745.
6. McComb DE, Nichols RL, Semine DZ, et al. *Chlamydia trachomatis* in women: Antibody in cervical secretions as a possible indicator of genital infection. *J Infect Dis* 1979;139:628-633.
7. McCormack WM, Alpert S, McComb DE, et al. Fifteen-month follow-up study of women infected with *Chlamydia trachomatis* . *N Engl J Med* 1979;300:123-125.
8. McCormack WM, Evrard JR, Laughlin CF, et al. Sexually transmitted conditions among women college students. *Am J Obstet Gynecol* 1981;139:130-133.
9. McCormack WM, Rosner B, McComb DE, et al. Infection with *Chlamydia trachomatis* in female college students. *Am J Epidemiol* 1985;121:107-115.
10. McCormack WM, Rosner B, Alpert S, et al. Vaginal colonization with Mycoplasma hominis and *Ureaplasma urealyticum*. *Sex Transm Dis* 1986;13:67-70.
11. McCormack WM, Starko KM, Zinner SH. Symptoms associated with vaginal colonization with yeast. *Am J Obstet Gynecol* 1988;158:31-33.
12. DeBuono BA, Zinner SH, Daamen M, McCormack WM. Sexual behavior of college women in 1975, 1986, and 1989. *N Engl J Med* 1990;322:821-825.
13. Peipert JF, Domagalski L, Boardman L, et al. College women and condom use, 1975-1995. Letter. *N Engl J Med* 1996;335:211.
14. Choi K-H, Catania JA. Change in multiple sexual partnerships, HIV testing, and condom use among US heterosexuals 18 to 49 years of age, 1990 and 1992. *Am J Public Health* 1996;86:554-556.
15. Douglas, JM, et al. Contraceptive practices before and after an intervention promoting condom use to prevent HIV infection and other sexually transmitted diseases among women — Selected US sites, 1993-1995. *MMWR* 1997:46:373-377.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Changes in Sexual Behavior Related to HIV/AIDS Knowledge

Jana E. Hesser, PhD, and Hyun Kim, PhD

"Over 500,000 people have been diagnosed with acquired immunodeficiency syndrome (AIDS) in the United States since the disease was first recognized.... With current knowledge the HIV epidemic can only be controlled through primary preventive strategies, particularly through modifying personal behavioral risk factors."[1]

A major component of HIV prevention is the avoidance of high-risk sexual behaviors. Alternative behaviors with low risk or no risk include: abstinence from sexual intercourse, monogamous sexual relations with an uninfected partner, proper use of condoms, and reducing the number of sexual partners.

In 1995 and 1996 the Behavioral Risk Factor Surveillance System (BRFSS) asked several questions about self-perceived level of risk for HIV infection and changes in sexual behavior related to knowledge of HIV. This paper presents results for these items for the combined 1995-1996 data.

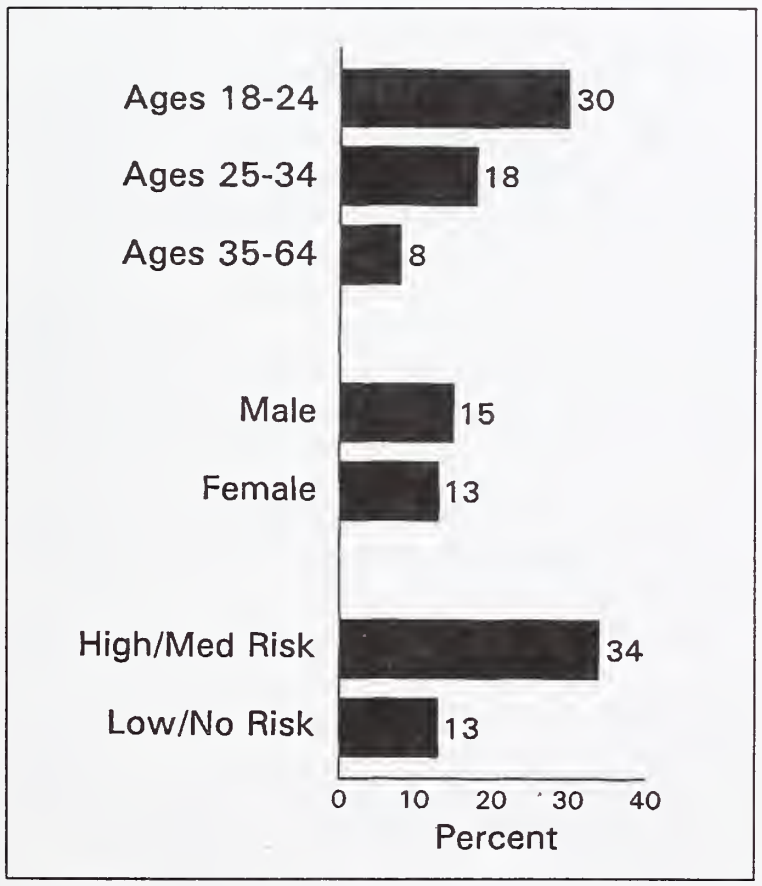

Figure 1. Rhode Island adults ages 18-64 who changed their sexual behavior in the prior 12 months due to HIV knowledge, 1995 - 1996, by age, gender, and self-perceived level of risk for HIV infection.

Methods

The BRFSS is an annual telephone survey of randomly selected residents ages 18 and older who live in households with telephones. It asks respondents questions about demographic characteristics and a variety of health behaviors, including ones related to HIV/AIDS. The BRFSS is currently performed in 50 states and 4 territories with funding and methodological standards provided by the Centers of Disease Control and Prevention (CDC).[2]

The BRFSS has been conducted in Rhode Island continuously since 1984. Each month a professional survey contractor performs telephone interviews with approximately 150 randomly selected Rhode Island adults, for a total of approximately 1,800 interviews each year. Sample weights are applied to each year's data so that analytical results can be generalized to Rhode Island's adult population.

In 1995 and 1996 respondents ages 18 to 64 were asked whether they had changed their sexual behavior over the prior 12 months as a result of their knowledge of HIV and were asked their self-perceived level of risk for HIV infection. Individuals indicating they had changed their sexual behavior during the prior 12 months were further asked whether those changes included having sex with only one partner, using condoms for protection, and/or being more careful in their selection of sexual partners.

Results

2,900 adults between the ages of 18 and 64 were interviewed in 1995-1996. When asked questions related to HIV and sexual behavior, about 2% refused to respond to those questions. Of those who responded, 5.5% considered themselves to be at high or medium risk of HIV, and 14.1% indicated they had changed their sexual behavior in the prior 12 months as a result of what they knew about HIV.

Behavior Change

The proportion of respondents reporting any change in sexual behavior due to knowledge of HIV varied among persons of different age, sex, and perceived risk. Younger adults (ages 18-24), males, and those who considered themselves to be at high or medium risk of becoming infected with HIV were more likely to have changed their sexual behavior in the prior 12 months than older

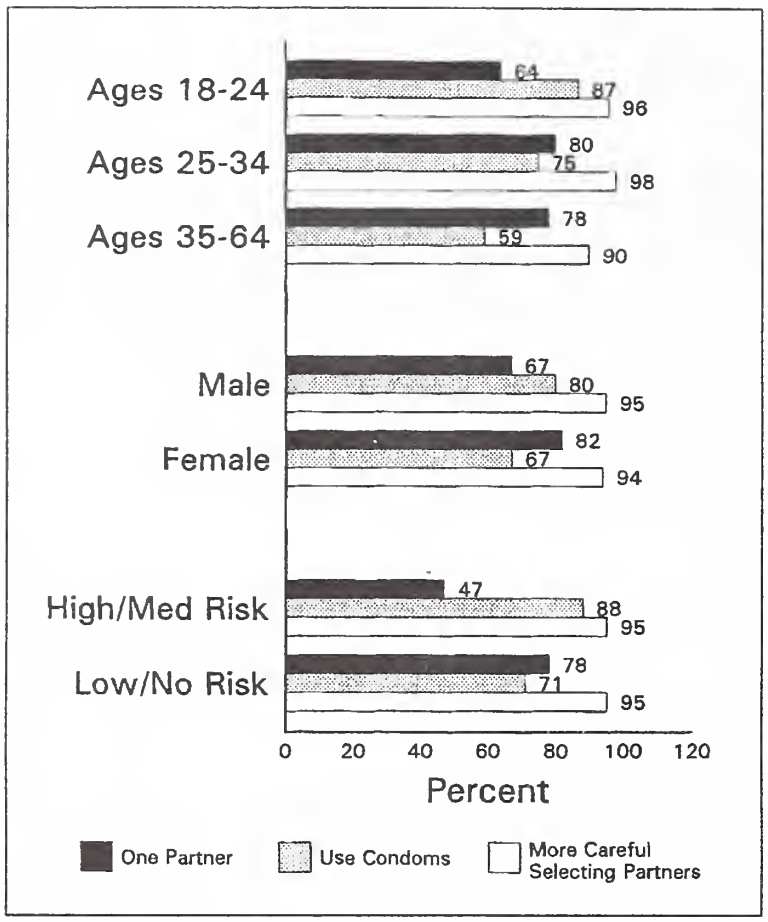

Figure 2. Types of changes made by Rhode Island adults ages 16-64 who changed their sexual behavior in the prior 12 months, 1995 - 1996, by age, gender, and self-perceived level of risk for HIV infection.

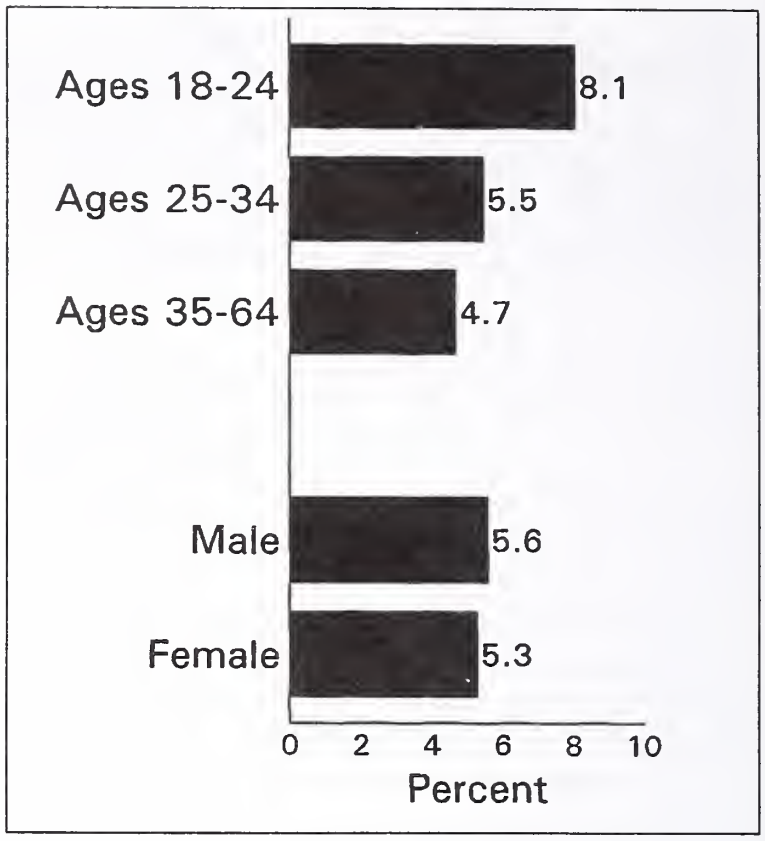

Figure 3. Rhode Island adults ages 18-64 perceiving themselves to be at high or medium risk of infection with HIV, 1995-1996, by age and gender.

adults (ages 25-64), females, or those who considered their risk of HIV infection to be low or zero. (Figure 1)

Of those who had changed their sexual behavior during the past 12 months, nearly all (95%) reported that they had been more careful in selecting their sexual partners as a result of their knowledge of HIV. The proportion reporting this behavior change varied little with age, sex, or perceived risk of HIV. Seventy-four percent reported restricting themselves to only one sexual partner and the same propotion (74%) reported using condoms for protection. The data imply that some respondents view these latter two behaviors as alternative prevention strategies: while 52% report practicing both behaviors, 45% report practicing one behavior and not the other. Only 3% report practicing neither behavior.

Of those who had changed their sexual behavior in the prior 12 months, respondents ages 25-64, females, and those considering themselves to be at low or zero risk of HIV infection were more likely to report changing their behavior by restricting themselves to only one sexual partner. Conversely, higher percentages of young adults, males, and those considering themselves to be at high or medium risk indicated using condoms for protection. (Figure 2)

Perceived Risk

5.5% of all respondents considered themselves to be at high or medium risk of HIV infection. Those ages 18-24 had the highest percentage considering themselves to be at high or medium risk for HIV infection; those ages 35-64 had the lowest percentage. Nearly equal proportions of males and females considered themselves to be at high or medium risk of HIV infection. (Figure 3)

Approximately one-third (34%) of those who consider themselves to be at high or medium risk of HIV have made changes in their sexual behavior in the prior 12 months that are likely to lower their risk of HIV infection. (Figure 1) Very high proportions are using condoms for protection and being more careful in their selection of sexual partners. Less than half indicated they are restricting themselves to only one sexual partner in order to reduce their risk of HIV. (Figure 2)

Discussion

Many Rhode Island adults report having made changes in their sexual behavior during the past year in order to reduce their risk of infection with HIV. However, nearly two-thirds of those who identify themselves as being at elevated risk for contracting HIV do not report behavior change, and of those who do report behavior change, over half had sex with more than one partner during the last year. Higher rates of behavior change among persons at risk for HIV infection are needed to reduce the prevalence of HIV and AIDS in the Rhode Island population.

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References

1. U.S. Department of Health and Human Services, Public Health Service. Healthy People 2000 Review: 1995-1996. Hyattsville, MD: National Center for Health Statistics, 1996. Page 158.

2. U.S. Department of Health and Human Services, Public Health Service. Health Risks in America: Gaining Insight From the Behavior Risk Factor Surveillance System. Atlanta, GA: Centers for Disease Control and Prevention, undated.

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

Proposed Prostate Cancer Screening Recommendations

Barry Stein, MD, and Joann M. Lindenmayer, DVM, MPH

Objective

The Rhode Island Department of Health assembled an Expert Panel on Cancer Screening to advise the Department on revising the State's current cancer control plan, published in 1989.[1] After reviewing the current screening recommendations of national organizations and the most recent pertinent literature, the Panel proposed a recommendation for prostate cancer screening.

Methods

- Review current prostate cancer screening recommendations of national organizations.
- Review the most recent literature pertinent to prostate cancer screening.
- Discuss.
- Propose a prostate cancer screening recommendation for the State's cancer control plan.
- Write a simple rationale for the proposed prostate cancer screening recommendation.
- Invite comments on the proposed recommendation and rationale.

Rationale

Prostate cancer screening was not addressed by the Rhode Island Cancer Control Plan for 1990-1992. One of the goals of that document was to "Screen all eligible people for cancer, using screening methods which have been demonstrated to reduce mortality or morbidity substantially." The proposed Rhode Island recommendations are based on adoption of that same goal for the current review process, and focus on screening with prostate specific antigen (PSA) tests and digital rectal examinations (DRE).

- In deciding which medical condition should be sought during screening, the first criterion is the burden of suffering caused by the condition.[4] Prostate cancer is the most frequently diagnosed cancer among men in the United States. More than 317,000 new cases of prostate cancer were diagnosed in 1996, and more than 41,000 deaths were attributed to prostate cancer.[5] Adding to the seriousness of this disease is the fact that prostate cancer, particularly in its later stages, is associated with significant morbidity and decrease in the quality of life.
- Two other criteria are important when deciding which medical condition should be sought during screening: the effectiveness of the ensuing treatment if the condition is found and the accuracy of the screening test.[4] In the case of prostate cancer screening there is no objective evidence at this time that screening with PSA and/or DRE decreases prostate cancer specific morbidity or mortality. Results of randomized controlled clinical trials of prostate cancer screening are expected, but not for at least a decade. [6,7,8]
- An intermediate outcome expected to occur prior to demonstrating effectiveness of any screening test for prostate cancer is detecting an increasing proportion of prostate cancer cases in earlier, localized stages. This has, in fact, occurred.[9] Treatment of prostate cancer in its earlier stages is associated with better survival than is treatment at later stages.[10] However, the discrepancy between the number of men estimated to harbor latent prostate cancer and the number of deaths attributed to prostate cancer annually make it appear that many prostate cancers are not clinically important.[11] Because it is not possible to distinguish between latent and aggressive cases of prostate cancer at this time, this raises the possibility that many men experience morbidity due to treatment that may have been unnecessary.
- In spite of the current lack of evidence regarding the effectiveness of screening for prostate cancer, screening for prostate cancer, particularly with PSA,

is widespread. Lacking such objective evidence, physicians who wish to perform prostate cancer screening tests have an additional obligation to educate patients about the potential benefits and risks of screening and treatment, and to take patient risk factors and preferences (for quality of life, fear of cancer, willingness to live with complications of surgery) into account.

- Because testing is widespread, physicians should be careful to apply screening measures particularly under conditions that optimize the positive predictive value of screening tests, for example, targeting men with risk factors such as older age, African American race, and family history of prostate cancer. Additional tests, such as percent free PSA, should be considered to increase the specificity of PSA testing in men with elevated PSA levels.[12]

- National guidelines for prostate cancer screening, particularly those for PSA, are being intensely debated. Within the next decade the results of randomized, controlled clinical trials of prostate cancer screening will become available. The Rhode Island recommendations for prostate cancer screening will be revisited should these study results or the results of other studies warrant a change in screening recommendations.

Current Prostate Cancer Screening Recommendations

Organization	Recommendations
U.S. Preventive Services Task Force[2]	• Routine screening for prostate cancer with digital rectal examinations (DRE), serum tumor markers (e.g., prostate-specific antigen, PSA), or transrectal ultrasound (TRUS) is not recommended.
American Cancer Society	• PSA and DRE should be offered annually starting at age 50 to men with at least a 10-year life expectancy, and to younger men (i.e., age 45) who are at high risk for prostate cancer (i.e., men with a family history of prostate cancer and African-American men). Information should be provided about potential risks and benefits.
American Urological Association	• Annual PSA and DRE substantially increase early detection and are most appropriate for men age 50 and older (40 and older for those at high risk, i.e., men with a family history of prostate cancer and African-American men). Such patients should be given information about these tests and given the option to participate in screening or early detection programs. PSA testing should continue in a healthy man who has a life expectancy of 10 years or more.
American College of Radiology	• A combination of DRE and PSA level should be used as an initial screening procedure. Use TRUS to evaluate men who have an abnormal DRE or PSA level.
American Academy of Family Physicians	• Men age 50 to 65 should be counseled about the known risks and uncertain benefits of screening.
American College of Physicians	• Physicians should describe the potential benefit and known harms of screening, diagnosis, and treatment, listen to the patient's concerns, and then individualize the decision to screen.
Office of Technology Assessment[3]	• Research to date has not determined whether or not systematic early screening for prostate cancer with PSA and/or DRE would save lives. The choice to have screening or forego should depend on patient values.
Canadian Task Force on the Periodic Health Examination	• Recommends against the routine use of PSA or TRUS as part of the periodic health examination. • The evidence is not sufficient to recommend that physicians discontinue use of DRE in men aged 50-70.

Proposed Rhode Island Recommendations

- PSA and DRE should be offered annually starting at age 50 to men with at least a 10-year life expectancy and to younger men (i.e., age 45) who are at high risk (i.e., men with a family history of prostate cancer and African-American men). Information should be provided about potential risks and benefits.

Comments?

We invite your comments on the proposed recommendation and rationale. Please send them in writing to Dr. Joann Lindenmayer, either by fax (401-861-5751) or by mail (Rhode Island Department of Health, 3 Capitol Hill, Providence, RI 02908-5097).

References

1. Rhode Island Department of Health. *Cancer Control Rhode Island. Plan for 1990-1992.* Providence, RI: Rhode Island Department of Health, 1989.
2. U.S. Preventive Services Task Force. *Guide to Clinical Preventive Services, 2nd ed.* Baltimore: Williams & Wilkins, 1996.
3. Office of Technology Assessment. Costs and effectiveness of prostate cancer screening in elderly men. Washington, DC: Government Printing Office, 1995. (Publication no. OTA-BP-H-145.).
4. Fletcher RH, Fletcher SW and Wagner EH. *Clinical epidemiology. The essentials.* Baltimore, Williams & Wilkins, 1988.
5. Parker SL, Tong T, Bolden S, Wingo PA. *Cancer Statistics, 1996.* Atlanta Ga: American Cancer Society; 1996.
6. Wilt TJ, Brawer MD. The Prostate Cancer Intervention Versus Observational Trial: A randomized trial comparing radical prostatectomy versus expectant management for the treatment of clinically localized prostate cancer. *J Urol* 1994;152:1910-14.
7. Johansson JE. Expectant management of early stage prostatic cancer: Swedish experience. *J Urol* 1994;152:1753-6.
8. Gohagan JK, Prorok PC, Kramer BS, Cornett JE. Prostate cancer screening in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial of the National Cancer Institute. *J Urol* 1994;152:1905-9.
9. Catalona WJ, Smith DS, Ratliff TL, Bosler JW. Detection of organ-confined prostate cancer is increased through prostate-specific antigen-based screening. *JAMA* 1993;270:948-54.
10. Kramer BS, Brown ML, Prorok PC, et al. Prostate cancer screening: What we know and what we need to know. *Ann Intern Med* 1993;119:914-23.
11. Woolf SH. Screening for prostate cancer with prostate-specific antigen. An examination of the evidence. *NEJM* 1995;333:1401-5.
12. Catalona WJ, Smith DS, Wolfert RL, et al. Evaluation of percentage of free serum prostate-specific antigen to improve specificity of prostate cancer screening. *JAMA* 1995;274:1214-20.

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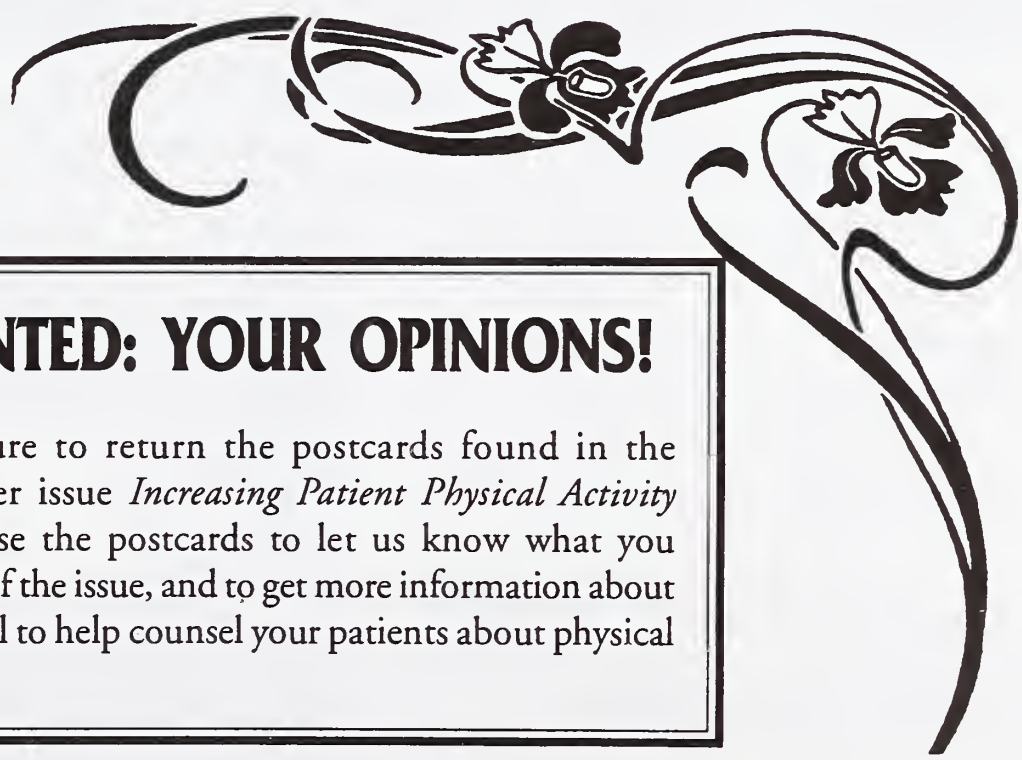

WANTED: YOUR OPINIONS!

Be sure to return the postcards found in the September issue *Increasing Patient Physical Activity Levels*! Use the postcards to let us know what you thought of the issue, and to get more information about a new tool to help counsel your patients about physical activity!

Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	April 1997	12 Months Ending with April 1997	
	Number	Number	Rates
Live Births	1,102	12,989	13.1*
Deaths	802	10,011	10.1*
Infant Deaths	(5)	(87)	6.7#
Neonatal deaths	(5)	(71)	5.5#
Marriages	548	8,294	8.4*
Divorces	241	3,224	3.3*
Induced Terminations	504	5,664	436.1#
Spontaneous Fetal Deaths	55	999	76.9#
Under 20 weeks gestation	(53)	(915)	70.4#
20+ weeks gestation	(2)	(84)	6.5#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	October 1996	12 Months Ending with October 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	308	3,243	327.5	4,286.0
Malignant Neoplasms	209	2,544	256.9	7,104.0
Cerebrovascular Diseases	47	580	58.6	874.0
Injuries (Accident/Suicide/Homicide)	26	328	33.1	5,954.5**
COPD	26	376	38.0	185.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

A Malapropisms Update

Animated Suspension in the Intercostal State: A Light-Hearted Ribbing

Stephen Davis, MD, and Tina Kenyon, LICSW, MSW

The most surprising aspect of misused medical terms, which we have been calling malapropisms, is not that they occur, not that they are humorous in subtle and not so subtle ways, but rather that they are so varied. Although certainly there are frequently confused phrases such as "prostrate problem," "Old-timer's disease," and "genetic drugs," there continue to be new phrases reported to and heard by the authors.

Lately, we have heard of a technique where a person is "held in animated suspension," perhaps the opposite of suspended animation and perhaps not an unpleasant state.

A mother of a child with fever due to chicken-pox asked if her daughter could have a prescription for "Advent." Another patient reported using "Ibumotrin." Curiously, a patient reported that for mild pain relief she took "aspirin without the aspirin."

An elderly woman was giving her medical history after being readmitted to the hospital from an outside facility. She reported that she had had a cold ever since she had left the "nursery" (nursing home). A parent reported that his child had been "cranky ever since he got his polio vitamins."

The diversity of medical malapropisms reflects the variety of medicine, the complexity of its terms, and also the wealth of the English language. The fact that English has roots in both Teutonic and Romance languages and has borrowed words from many other sources, encourages the verbal confusion. A nutritionist reported that one of her patients became nauseous whenever she put food into her "sarcophagus." A young woman said that she had been having a busy time and had "run the gambit."

A humorous but emphysematous elderly gentleman, when asked whether he was short of breath, replied, "No, but I have always been short." Another patient being humorous included in his medical history a "pop-pop-fizz-fizz bypass," and another woman seemed to be conquering her anxiety when she said, "I can handle hyperventilating; I just blow it off."

Many malapropisms are better descriptions of the actual medical process than the appropriate term. Among these are "the bone destiny study" that a middle-aged woman reported having. When asked about his insurance coverage, another patient said that his health insurance was "medicaided." An office nurse, perhaps expressing her true feelings, said that a young boy had come to the office for a "wild child checkup," instead of a "well child checkup." Two of our patients have recently reported going to a "thermatologist," presumably for an inflammatory rash, which makes me wonder if I should ask about alternative healers in the community. Heartburn was treated by another patient with "tagamints"— now, fortunately, over the counter.

One of the doctors in our group reported a patient who felt that he had "post-dramatic stress disorder." Other phrases that may seem to make more sense than the correct phrase include a child described as "the splitting image of her mother," and many patients may find it odd that they are scheduled to have a "Valium stress test." A pregnant woman felt that she had been pregnant long enough and that she was "ready to be reduced." ICUs are often referred to as "excessive care units" or "expensive care units". A child reported having a "hearache." An enthusiastic young man announced that he had a "pulled hampster string" and that his friend was on "crunches for a broken leg." The same young man thought that he had heard his father talking about "Helicopterbacter pylori."

Current events may also find their way into medical terminology. One patient announced that it was time for her "Depco" (Depo-Provera) shot. A concerned mother brought her sixteen year old daughter to the OB-GYN service to have them check her daughter's "Heineken" (hymen).

A mother reported that her son had a "biblical (umbilical) hernia." A young woman in a family planning clinic requested some "condoms without the Minoxidil" (nonoxynol). At the same location a woman presented her history as including a "bilateral tubal litigation."

An editor, perhaps jokingly, said that he did a lot of "Acapulco" singing ("a capella"). Similarly, a local physician, was referred to unintentionally as

Dr. Greenback, a close approximation of his name.

A patient who formerly announced that she was up the "tree without a paddle" decided more recently that she was "up the creek without a shovel."

Two words may be combined into one. A patient, describing an immigrant friend, said that she was "Guanamanian." Perhaps she was from Panama by way of Guatemala. Another combination of words occurred in an everyday conversation when a beautiful sunset was described as having "every color of the rectum." (rainbow and spectrum?)

We have come across dictation errors both in the popular press and in reports from colleagues. Since these are errors of transcription due to a dictated word not being heard properly or an error caused by the proper word not being known by the typist, these errors may not technically be malapropisms, but they can be humorous. They can also occur as a result of grammatical errors committed by a hurried dictator. Some classics are "The pelvic exam was not done in the ER, but it was to be done later on the floor," and the "empty cellar syndrome." A procedure report described the device used as a "well-challenged sigmoidoscope." (Welch Allen) A medical student reported a dictation becoming "displeasure of the prostate." ("dysplasia," but note the rare correct use of "prostate"). A colleague from South County noticed that his attempt to dictate "guttate psoriasis" became "duck tape psoriasis," thereby further advancing the medical uses of that misspelled miracle tape.

The careful listener may pick up some subtle mistakes in terminology. A Family Medicine resident's patient reported that she had been to "Overeater's Anomalous." Another patient said that a relative had been treated at the famous cancer center (and deli?) in New York City: "Sloane's Catering."

A young woman, in an unintentional endorsement of medical professional ethics, bemoaned the fact that she had been to several doctors, and none had been able to help her with her "virginitis."

Primary care physicians sometimes have to decide which specialist is appropriate for a particular problem. To whom would you refer a patient who presented with "impacted cerebrum" in his ear? Or a patient who wanted surgery "to correct sleep apathy?" How do you manage a family history of "cerebral hemorrhoids?" Another young woman said that she was deaf in one ear because she "had gotten information in it as a child." Do you send her to Brown's CIT building?

An ER patient giving his medical history noted that among other tests he had had a "VIP ...and a saunagram." Another patient wondered how he "got the pig sty" in his eye.

And, to end on a somewhat bawdy note, at a RI Academy of Family Physicians board meeting, it was announced that, among other national policies that were reviewed, the American Academy of Family Physicians had come out "against female genital manipulation...er, mutilation."

[Thanks to the numerous colleagues who contributed many of these phrases: David Ashley MD, Mark Ringiewicz MD, Kathy Papineau RN, Peter Elias MD, Julie Davis MD, David Holub MD, Ben and Arnold Goldberg MD, Dorothy D'Allessio RD, William Bunnell MD, Jim Thompson MD, Bruce Robertson MD, Jane Auger, MD among others.]

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Point of View:
From Gregor Mendel to Coronary Atherosclerosis

Robert D. Corwin, MD

Charles Robert Darwin and Johann Gregor Mendel lived contemporaneously. They never met nor knew of each other's work. At a time when the science of heredity had its beginnings it would have been of more than academic interest if these two giants had discussed their mutual interests. It is likely they would have immediately understood the significance of each other's findings.

Johann Gregor Mendel

Johann Mendel,[1,2] the second child of Anton and Rosine Mendel, was born July 22, 1822 in Heinzendorf, Silesia. The name Gregor was added years later when he joined the Augustinian order. His peasant father, who had a great fondness for fruit-growing, kept a large orchard adjoining their house. The parish priest encouraged fruit-growing in the area - giving advice, help, and making sure the children were in-

structed in the latest methods of cultivation.

Johann Mendel's exceptional school talents were recognized early by the town teacher, who encouraged Johann's parents to provide further education. Mendel's studies prepared him for both mathematics and botany, an invaluable combination. He conducted his classic and in-depth hybridization experiments on *Pisum* - the edible pea - between the years 1856 and 1863. In preparation for this seven-year effort, he worked for two years with particular kinds of peas, breeding them under close observation indoors and out. Rather than description, Mendel wanted insight. He intuitively grasped the significance of "pure lines" and the importance of working with one pair or a few pairs of strongly contrasted characteristics if he were going to obtain meaningful data. The concepts of cross-fertilization and self-fertilization were well known at the time. Mendel chose only those characteristics that were quantifiable - a novel idea helped along by his mathematical training. He stated, "The true numerical ratios can only be deduced from the greatest possible number of individual values; and the greater the number of these the more effectively will mere chance be eliminated."

Mendel selected seven pairs of characteristics for his experiments:

1. shape of the ripe seed: round or wrinkled
2. color of the cotyledons: yellow or green
3. tint of seed-coat: white or non-white
4. shape of ripe pods: smooth and curved or constricted between seeds
5. tint of unripe pods: green or yellow
6. position of flower: axial or terminal
7. stature of plant: tall or short

It was Mendel who represented the dominant character by the letter A, recessive by a, and the hybrid, Aa. These are "external findings" verified by cross-breeding. Mendel did not consider hereditary concepts.

Because of his mathematical skills, because he confined his attention to verifiable features, because he examined each plant separately, and because he kept accurate records of each generation, he deduced that a number of individual characteristics were separately transmitted, were rigidly and unalterably composed and transmitted whole.

Following lectures in February, 1865, in Brünn, Moravia, these studies with *Pisum*, entitled *Experiments in Plant-Hybridization*, were published in the Proceedings of the Brünn Society for the Study of Natural Science. From this work Mendel formulated these propositions:

1. Of the two antagonistic qualities, the hybrid always exhibits only one and that in full development.
2. During the formation of the pollen cells and the ovules, the two antagonistic qualities separate each from the other.
3. The two primal characters issue distinct and unaltered out of the hybrid form, and there is no evidence either has taken anything over from the other.
4. Each individual pair of contrasted characters undergoes its own separation *independently* of *all* other pairs.

These Mendelian laws have maintained their primacy into the era of molecular biology.

Coronary Atherosclerosis

Coronary atherosclerosis within the context of premature cardiovascular disease is mainly a hereditary disorder. If an individual under the age of 60 has a coronary insult, there is a better than 1 out of 2 chance another first degree relative will have this problem.[3] If the insult occurs before the age of 40, the probability is almost 100%.[4]

Several familial lipid disorders obey Mendelian principles: familial heterozygous hypercholesterolemia, familial combined hyperlipidemia, familial hypoalphalipoproteinemia, high triglyceride and low HDL-C (a disorder without a name), hyperapobetalipoproteinemia, and type III dyslipidemia. All are relatively common, are associated with an increased incidence of coronary atherosclerosis and have a dominant mode of inheritance. These entities would be considered "pure" disorders. Hybrids can also occur, such as hypoalphalipoproteinemia (low HDL-C) associated with familial heterozygous hypercholesterolemia (high LDL-C). Very few adults know the name of their lipid disorder or even understand how it works. They are surprised to learn that it can be transmitted to their children.

Much has been written about risk factor screening and rightly so. Obesity, diabetes, myocardial insult syndromes, and pregnancy distort lipid values, and the appropriate medications, including birth control drugs, only complicate these issues further.

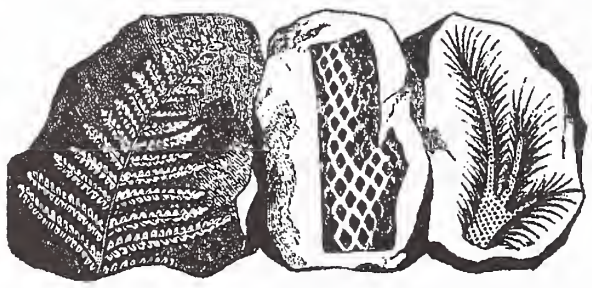
Family physicians, internists, and pediatricians will need to perform a lipid profile when there is a family history for premature cardiovascular disease and they are contemplating the use of birth control medications. Profiling should be done before and one month after starting such drugs. Birth control medication can profoundly perturb lipid metabolism.

Most hereditary lipid disorders make their blood sampling presence known around the onset of puberty; repeat sampling during the second decade of life will be necessary to pinpoint the specific type of lipid disorder. Not all lipid or lipoprotein components are expressed at the same time. In addition, as part of the work-up, all first degree relatives of the proband over the age of 10, as well as grandparents, are also evaluated. One can readily discern the relationship of our current genetic work-up to Gregor Mendel's thinking and experimentation with *Pisum*.

How then does one ascertain the presence of a significant lipid disorder? A parent with a total cholesterol over 240 or the presence of a family history for premature cardiovascular disease is critical. The definition of premature cardiovascular disease includes angina, myocardial infarction, unexpected sudden death, or coronary artery procedures (cardiac catheterization or surgery) in a male under the age of 55 or a female under the age of 65. Pediatricians and family physicians will need to ask about the grandparents and whether they too have elevation of cholesterol or premature cardiovascular disease. Not all lipid disorders causing coronary atherosclerosis will be discovered by this approach, but those causing severe problems will. The physician should know which lipid entity or entities s/he is dealing with, whether "pure" or hybrid, before beginning treatment.

In the presence of a family history for premature cardiovascular disease, all children over the age of 10 should undergo a fasting lipid profile (total cholesterol, HDL-C, triglyceride, computed LDL-C, apolipoprotein A-1 and B). Early screening will usually obviate the confounding aspects of obesity, diabetes, myocardial insult, and certain medications. In the pediatric patient, if the initial fasting lipid profile is normal, it should be repeated in three years.

Primary prevention of the cardiovascular complications resulting from genetic lipid disorders is now a realistic goal. The diagnosis can be established in most instances in the second decade of life. It is hoped that early identification and treatment of children and adolescents will prevent or delay premature cardiovascular disease.



Epilogue

One can only marvel at the observational tenacity of this humble, gentle, and scholarly Augustinian monk. His colleagues hardly knew what to make of all those numbers and ratios he presented in lectures and writings. But he had come down upon a fundamental truth of nature, and he knew it. Three decades after his death, others would rediscover and understand what he had to say.

References

1. Orel V. *Gregor Mendel The First Geneticist.* NY: Oxford Univ Press, 1996.
2. Iltis H. *Life of Mendel.* NY: Hafner Publishing Co., 1966.
3. Genest J. Jr., et al. Familial lipoprotein disorders in patients with premature coronary artery disease. *Circulation* 1992;85:2025-2033.
4. Kwiterovich P. Jr. personal communication.

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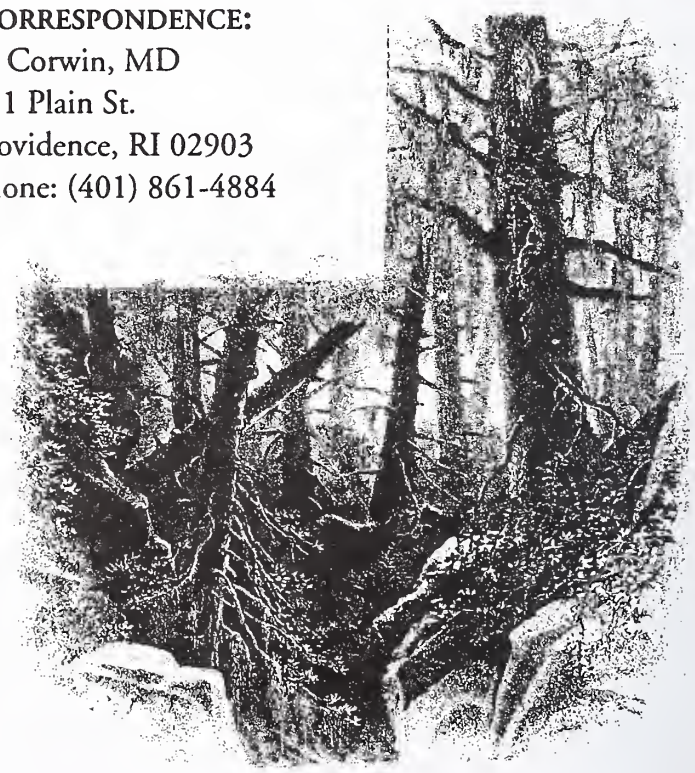
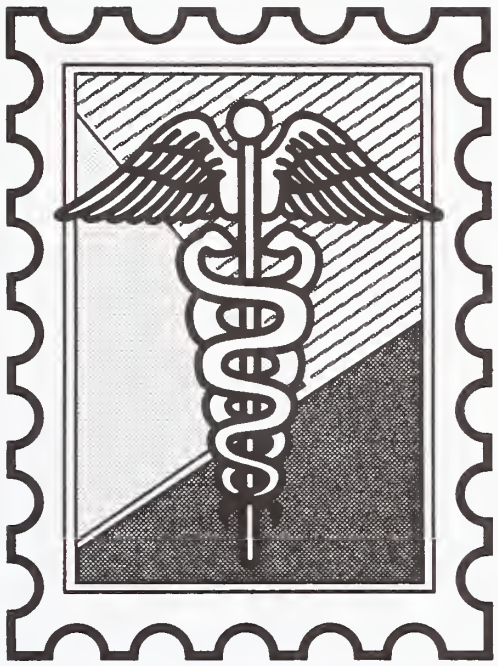


Philately in Medicine

John Tierney



The Morocco Cooking Scandal of 1959

Morocco, the home of the Berbers, is an ancient kingdom in the northwest corner of Africa, bordering both the Atlantic and the Mediterranean. Its population is about 30,000,000. Its major cities include Casablanca, Rabat, Fez and Marrakesh.

In 1959 a terrible tragedy affected many Moroccans. About 10,000 individuals were poisoned when they were fed foods cooked in oils which had been illegally adulterated with lubricating oils. Most of those affected developed a diffuse neurological disorder within days; many succumbed. Epidemiologists noted a curious characteristic of this intoxication: it was virtually confined to middle class individuals since, it was conjectured, the wealthier could afford imported oils while the poorer used cooking oils only sparingly.

The merchants responsible for the adulteration were eventually identified and beheaded.

In 1960 Morocco issued a set of five semi-postal stamps to recognize the victims of this tragedy while simultaneously raising money for their chronic medical care. These stamps represent the first set of semi-postal stamps ever issued by Morocco. In the Scott Standard Postage Stamp Catalogue, they are listed after the definitive or regular stamps under the heading "Semi-Postal Stamps." They are numbered B 1 - 5. [Morocco, 1960, # B 1 - 5.] The capital B identifies the stamp as a semipostal. In addition, the semipostal displays two separate monetary denominations; the first and larger, represents the price of the postage and the second, a lesser amount, represents a mandated contribution to a specified charity and is known as a surtax. The Moroccan surtax is described as follows: "The surtax aided the families whose members consumed adulterated cooking oil with crippling or fatal results."

This series of stamps depicts Sultan Mohammed V, ruler of Morocco, who had been deposed by the French in 1953 but, through local agitation, was returned to the throne in 1955. He continued to rule until his death in 1961.

The United States Postal Service does not issue semipostal stamps.

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Ninety Years Ago

[October, 1907]

The major article is a learned paper by H.A.Jones, MD, on the prevalence, causes and treatment of insanity. It is a widely ranging essay, exploring such unrelated subjects as expressions of insanity in the Scriptures, the inheritance of ignoble traits and the United States' current immigration policy. The author observes that "insanity is universal. Its bounds are unlimited. It is a disease with an ancient history." He cites the Bible to illustrate instances of insane rage, pathologic jealousy and deepening melancholy. He comments that "Insanity is a disease that can be feigned to such a degree that only those who are well trained in its teachings can distinguish it."

Of the many etiologic forces, the author first reviews heredity. "Are the sins of the fathers visited upon the children, as promised to transgressors of moral and spiritual law ? ... and if the syphilitic father or mother can implant in their offspring the germs of physical disease, why cannot the dissipated father and nervous mother implant a neurotic element in their child ?" Dr. Jones observes further: "The foreign population that is coming to our shores increases the number of insane by the thousands, ... and the taxpayers are groaning over the bill that comes upon them while they are their 'brother's keeper.' Insanity is increased among our native whites by intermarriage with this foreign tainted element."

Overwork and overstudy are yet another factor, because "There is no room in the race for the mental sluggard." Yet, Dr. Jones cautions, "many young people are wrecked mentally because of overwork and overstudy."

Dissipation "ranks next to heredity as the chief cause in the increase in insanity." A dissipated, alcoholic parent might transmit to his offspring thievery, mental perversion, dipsomania and other stigmata. Dissipation is primarily a dependency on alcohol but may include, also, an addiction to cigarettes.

Finally, the author summarizes his views as to treatment appropriate to each form of mental distress and disability. He stresses the need for construction of more "detention" hospitals.

The American Proctological Society proceedings are summarized, including papers on pruritis ani, hemorrhoids, surgery for ano-rectal fistula, ocult rectal bleeding, the etiology of fissures and fecal impaction.

Fifty Years Ago

[October, 1947]

Robert E, Martin, MD, summarizes abdominal hysterectomies performed at Rhode Island Hospital from 1941 to 1945. A total of 664 such procedures were carried out with an operative mortality rate of 0.6%. The symptoms, age distribution and lesions determined by pathological examination are listed. The commonest lesion was a uterine myoma, accounting for 55.2% of the procedures. Carcinoma of the uterus or adnexae accounted for 5.6% of the 664 cases. Of the four deaths, two are ascribed to postoperative myocardial infarction, one to diffuse vascular disease and shock, and one to hemorrhagic peritonitis.

Frederic J. Burns, MD, discusses a relationship between coronary thrombosis and diet, postulating that dietary intake may indeed influence the circulating concentrations of cholesterol, and that hypercholesterolemia, in turn, may increase the development of vessel-narrowing atherosclerosis.

Louis E. Burns, MD, explores the use of choline chloride in a 45 year old patient with hepatic cirrhosis who had undergone 106 paracenteses.

A case of lower nephron nephrosis in a 31 year old woman is discussed by Drs. Chester Keefer and B. Earl Clarke.

Twenty Five Years Ago

[October, 1972]

The lead scientific article, authored by Leonard J. Triedman, MD, Albert E. Carlotti, Jr., DDS, and Philip Faraci, MD, discusses the principles and techniques of autogenous bone grafting to the mandible, particularly in surgery of head and neck cancer. The donor bone is the autogenous iliac crest. Six cases are reviewed in detail.

A. Louis Mariorenzi, MD, and Anthony F. Merlino, MD, report on total hip replacement with cement fixation. Seventeen cases are reviewed.

Howard S. Sturim, MD, and Clyde T. Jacob, MS, demonstrate that injection pharyngoplasty [using teflon] is a useful method for treatment of velopharyngeal insufficiency and hypernasal speech.

Two vivid recollections of the great hurricane and tidal wave of September 21, 1938, are provided by Earl A. Bowen, MD [from his experiences at Rhode Island Hospital with over 200 hurricane victims] and Maud Denico, RN [from her experiences at South County Hospital.]

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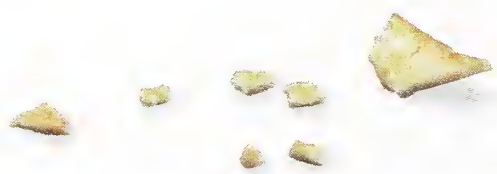

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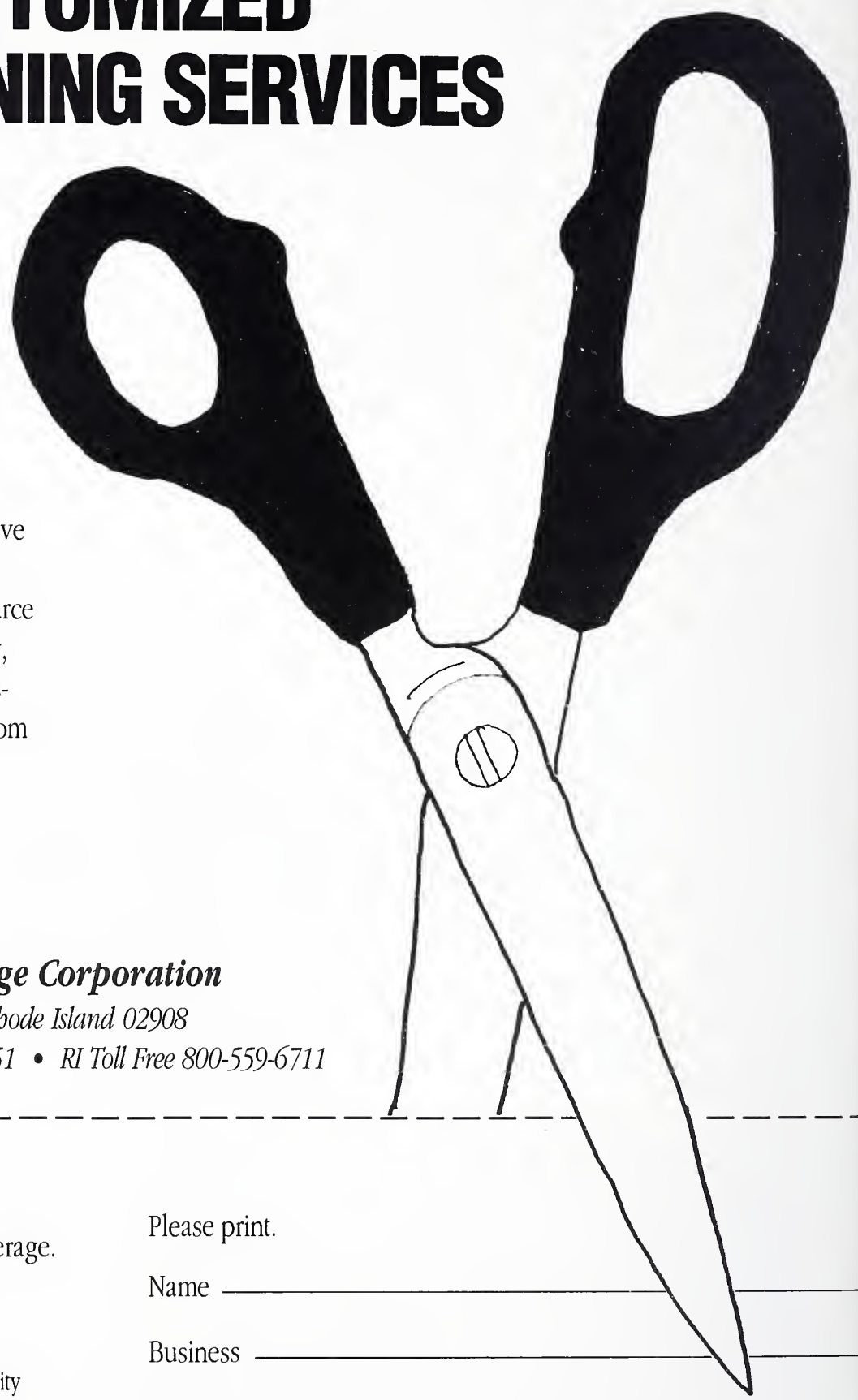

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COMMENTARIES

The Long and Fevered Pilgrimage to Samoa

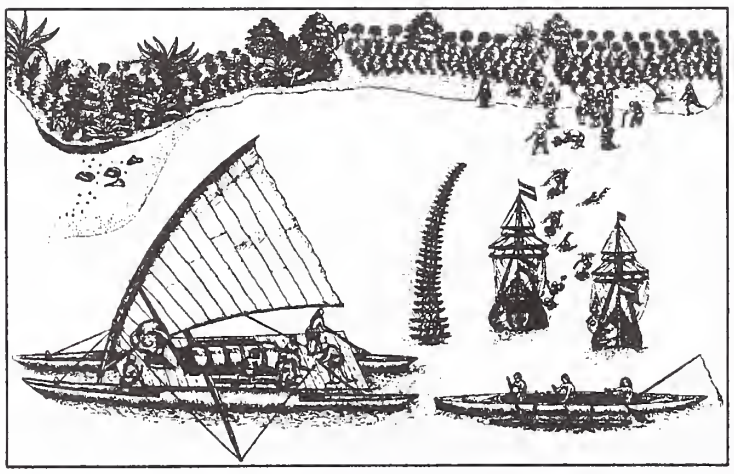
Even by 19th century standards Lou was a fragile lad barely surviving the rigors of infancy. Early childhood was reduced to a succession of infections, relapses and long intervals of confinement. Schooling, too, was interrupted by episodes of abject fatigue. The family assumed that his "weak lungs" and asthenia were a heritage from his mother and maternal grandfather, both of whom were victims of consumption.

His father was a wealthy civil engineer responsible for Scottish coast harbor projects, and Lou entered Edinburgh University intent upon a career in lighthouse construction. The collegiate years were of little value since he absented himself from most classes either because of fatigue, indifference to the subject material or the pursuit of profligate pleasures. In 1871 Lou switched to a career in law which, after three years of apathetic study, also came to naught.

Lou lived in a community where fear of perdition was pervasive and where all souls could be divided into the elect or the damned. He was close to his father, a Calvinist engineer who was certain that life's problems would readily yield to a slide rule or a scriptural reading. In 1877 Lou joined a local club noted for its irreverence and for its dalliance with Darwinism and atheistic notions. A deep cleavage inevitably arose, and father and son went their separate ways. In the decade which followed, this tuberculous exile travelled much of the world, married an American woman years his senior and managed to have some of his Scottish adventure stories published.

In 1886, at age 36, Lou wrote a novella which had its origins in a fevered nightmare. Within six days he completed the manuscript, some 60,000 words, which later captured the imagination of a generation of readers. It was, in his judgment, a gothic allegory upon the duality of man, a moral fable disguised as a narrative.

It was a tale told by a London barrister concerning the moral deterioration of his client, an erstwhile upright and diligent physician. The story begins with an act of cruelty perpetrated by a strange person who, as the reader slowly learns, is somehow related to the physician. This shadowy person is variously described as small of stature and with a soul bearing Satan's signature. As the story unfolds the reader learns that the troubled physician has recently forsworn friendships. The concerned lawyer then seeks advice from another practitioner who suspects that a malevolent bond exists between the physician and the evil stranger. He further fears that delving into this bond is fraught with hazard and that exploring the realm of forbidden knowledge, in general, is a deadly enterprise.



The lawyer, worried that the physician's life is in jeopardy, hastens to his home and breaks into the research laboratory located in the rear of his house. He encounters the evil stranger about to take a potion consisting of a few minims of a blood-red liquor and some unspecified powder. The lawyer is advised to leave but he refuses and the stranger then mixes the potion causing an audible effervescence with vaporous fumes. The potion consumed, he reels, staggers and clutches at the table. And before the unbelieving eyes of the lawyer, there materializes the dying form and substance of his friend, the physician. The physician's final testament is then revealed. In it he recalls the evil side of his youth. He then discloses his heretical experiments during which he encounters a drug "which dethroned from supremacy the upper elements of my soul." It causes him to be physically transformed into the embodiment of the evil side of his nature; then, with conscience slumbering, his life becomes "a vicarious depravity." During these drug-induced intervals, when the stranger [named Mr. Hyde] holds sway, numerous evil acts are undertaken including the scrawling of blasphemies in the margins of pious works; and, at one point, even destroying the portrait of the physician's father. In a final redemptive act, the physician, Dr. Jekyll, dies, thus denying Mr. Hyde any further access to a vulnerable world.

The fable, called the Strange Case of Dr. Jekyll and Mr. Hyde, was indeed a parable on the primitive duality of man and a warning of the perils when man ventures to illuminate the darknesses beyond his moral limits. It is a tale, too, which ultimately reconciles Lou to his father's beliefs after almost a decade of separation. Above all, the story represents Lou's atonement for his prior atheistic irreverences. But it stands too as the author's warning to those in the sciences who impetuously carry their research beyond accepted limits. Edinburgh in the 1870's was a hotbed of scientific speculation. A great medical school in its midst was

exploring the nature of the germ theory of disease, creating anesthetic agents to diminish the pain of childbirth, formulating newer drugs, and seeking newer insights into the kinetics of disease. Secular explanations were now offered where formerly people accepted, without questioning, the premise that all was God's will. Should there be doubts that Lou regarded science as an apostasy, this fable begins with a fragment of poetry: "It is ill to loose the bonds that God decreed to bind."

For the next seven years Robert Louis Stevenson, known to his family as Lou, travelled the world seeking spiritual respite and physical relief for his chronic tuberculosis. His wanderings took him to Newport, Rhode Island, and finally to the Polynesian islands and ultimately Samoa where this "Presbyterian invalid," as he once called himself, finally found some measure of peace, aided in no small measure by his daily laudanum. He died suddenly on December 3, 1894 at the age of 44. The author of *Treasure Island* and *Kidnapped* was interred on a hilltop overlooking the Pacific Ocean, his personally chosen burial site. "Here he lies where he longed to be; Home is the sailor, home from sea."

– Stanley M. Aronson, MD

The Amazing Story of Dallas Boushey

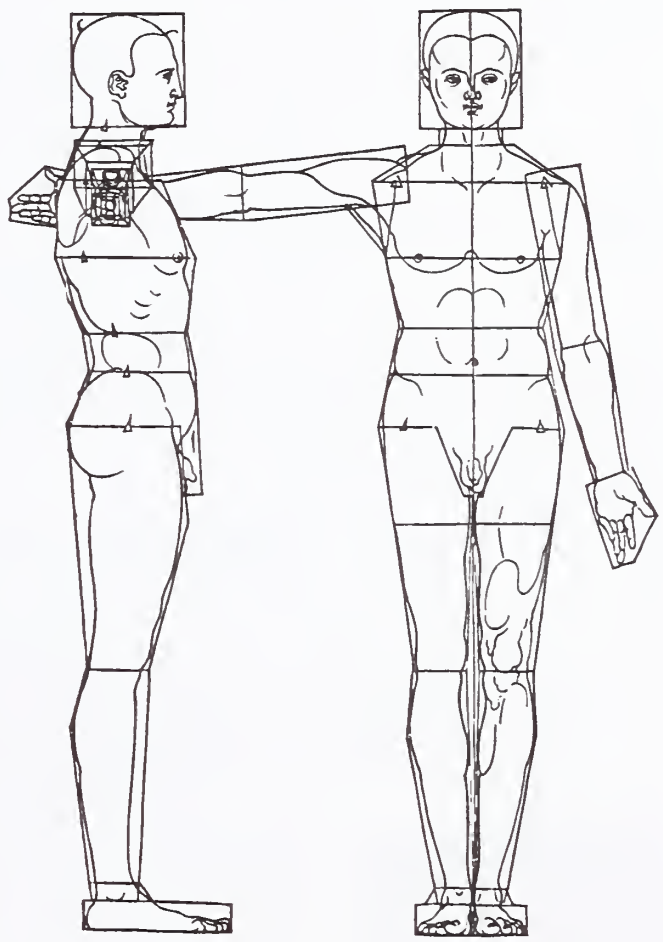
Dallas Boushey, a native of South Burlington, Vermont, began work at the University of Vermont College of Medicine in the late 1930's. In time, he eventually became one of the school's most distinguished professors of anatomy. While these facts in themselves are not so remarkable, they become so when we consider that Professor Boushey was an eighth-grade drop-out who was hired by the college as a janitor! Without taking so much as a single formal anatomy course, the self-taught Boushey eventually worked his way into a full tenured medical school professorship, and he did so without so much as a high school diploma.

In 1937, when he began work at the medical school sweeping and mopping floors, Boushey immediately impressed the staff with his diligence and reliability. Of course, none of the anatomy professors imagined that the efficient janitor would someday become one of their most respected colleagues. At that time, Boushey didn't even know what the word "anatomy" meant. He seemed fully content as a maintenance man, and, without even a high school degree, how far could he expect to advance at a prestigious medical school?

In 1940, Boushey's exceptional job performance caught the attention of anatomy professor Dr. Walter Stultz. Stultz asked Boushey to take charge of laboratory maintenance. In addition to sweeping, mopping, and keeping the laboratories thoroughly spotless, Boushey's new duties also included assisting Dr. Stultz with the embalming of corpses.

Dr. Stultz was startled by how quickly the janitor mastered all of the embalming procedures. Realizing that Boushey's apparent intelligence could be put to better use, the physician taught Boushey how to assist with dissections. Before long, Boushey had helped Dr. Stultz to develop a method for retrieving delicate human bones with which the medical students could study. Boushey, now involved in something far more sophisticated that simple sweeping and mopping, became fascinated by the new work, but he also felt frustrated by his thorough lack of knowledge.

He began to ask questions. "What are the names of



those muscles and bones? How do they function? How are they attached?" As Dr. Stultz recalled many years later, the bright janitor "wanted to know it all. I taught him the information as we worked. He would remember the names and repeat them to me the next day. It was at this point that I realized Dallas Boushey was unique. Even with his lack of education, he had the innate intelligence to learn the material."

One evening, Boushey asked Dr. Stultz if he could borrow a copy of *Gray's Anatomy*. With its complex terminology and diagrams, the book was very difficult reading for a man with an eighth-grade education. At first it seemed impossible to Dr. Stultz that Boushey could ever grasp all of the material. But the eager janitor had made up his mind. Every evening after dinner, Boushey wrestled with the text

and delved further and further into the enormous volume, using English and medical dictionaries to look up every word that stumped him. His wife copied passages out of the book and quizzed him on the material. And each morning at work, Boushey would discuss what he had learned with Dr. Stultz.

The faculty of the medical school was startled. One anatomy professor recalled that "Boushey would look up eponyms (uncommonly used names for parts of the body) in the dictionary. He used to bandy these names about and try to mystify the faculty. In time, whenever faculty members had a question about anatomy, they would go and ask the janitor!"

Indeed, after two years of studying the book and performing dissections with Dr. Stultz, Boushey had acquired a knowledge of anatomy that surpassed that of most physicians. Soon, while the students were studying at the anatomy tables during class, Boushey was allowed to go around and answer their questions.

Surprisingly, the medical students did not resent being taught by a high school drop-out. As one student recalled, "Boushey didn't have all that educational mush behind him. He could talk to us in simpler, more understandable terms." Over the next few years, the janitor-turned-scholar became increasingly active in teaching. And, although he didn't have so much as a high school diploma, he became a favored faculty member among the students. "He was more on our level than the other professors were," recalled one student. "He was gentle and down-to-earth. We could really talk to him."

Even greater achievements were soon to come. In 1944, when his students complained about the confusing nature of the one-dimensional illustrations in their anatomy books, it occurred to Boushey that anatomy would be easier for the students to comprehend if they could actually pick up and closely examine three-dimensional models. Boushey coiled stovepipe wires, wrapped them in gauze, and painted them in latex. In time, he had constructed sophisticated models of virtually every part of the human body. Over the next twenty years, his models were displayed and utilized at medical schools throughout the country. Across the nation, professors had a difficult time believing that these highly technical and anatomically precise models were the work of a high school drop-out and former janitor. Still, there was no disputing that the models were the most sophisticated and advanced of their kind.

By the 1960's, Boushey was teaching anatomy at the medical college full-time, and there were more and more inquiries as to his official status. School officials began scratching their heads. How could they formally classify a brilliant teacher who, although he had risen to become the college's most popular and knowledgeable teacher of anatomy, had begun work as a janitor and held not even a basic high school diploma? The administrators tried out several new titles on Boushey, including "senior technician" and "demonstrator in anatomy." But somehow, considering that Boushey was the school's foremost expert in human anatomy, the titles seemed inadequate. Still, as Boushey was an eighth-grade drop-out, he could not legally be referred to as "Doctor" Boushey.

Finally, in 1972, Dr. William Young, then chairman of the anatomy department, suggested that the University of Vermont Board of Trustees afford Boushey a full professorship in anatomy. In other words, without having even graduated high school, Boushey would henceforth be known as "Professor Boushey" and would enjoy a salary and tenure appropriate for the position. The Board of Trustees pondered the recommendation and finally, when students and faculty voted Boushey Teacher of the Year for 1972, granted the former janitor a full academic professorship.

Despite his lofty new position, Boushey did little in the way of altering his lifestyle to fit his new rank. As his wife put it, "He is one of the most unchangeable people you can imagine. He builds his models, teaches classes, and never stops reading anatomy. He feels uncomfortable at fancy parties. I've even seen him turn red when someone calls him professor. He's still the quiet, modest man he was in 1937." Boushey himself once noted, "These days students ask me whether they should call me doctor or professor. I tell them, "Just call me Dallas."

By the time he retired, the highly admired professor had made medical history. He was, and remains, the only high school drop-out to become a full professor at a 20th century medical school, proving that curiosity, experience, and self-motivation, even more than formal degrees and titles, are the precursors of true wisdom.

– Charles Turek Robinson

This commentary was excerpted with permission from author/anthropologist Charles Turek Robinson's latest work, True New England Mysteries, Crimes and Oddities *(Covered Bridge Press, 1997), available at major booksellers.*

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Obesity: What Are the Options to Make a Difference?

Vincent Pera, Jr., MD, and Nancy A. Beauchene, MS, RD

Introduction

The rate of obesity among children, adolescents, and adults has increased considerably in the United States over the last decade. According to the Third National Health and Nutrition Examination Survey (NHANES III) (1988-1994), approximately 14% of children, 12% of adolescents, and 35% of adults were overweight.[1] The Behavioral Risk Factor Surveillance System for Rhode Island estimated 25% of adults are overweight.[2] National figures show higher obesity rates for non-Hispanic black women (52%) and Mexican American women (50%). In all, this creates a tremendous challenge for public health professionals and the medical community to achieve the Healthy People 2000 Objective: to reduce overweight to a prevalence of no more than 20% of people aged 20 and older, by the year 2000.[3]

Obesity is a national epidemic. It has also been described as an incurable chronic disease.[4] Few who lose weight maintain the loss five years later. The cause is multifactorial. Psychological, behavioral, social, cultural, biological, and genetic factors play a role. These vary from person to person, making both prevention and treatment difficult and complex.[5,6]

In a society that values thinness, persons who are overweight are often perceived as lazy, ugly, and weak-willed - a judgment instilled at early ages. Moral judgment is placed on them not only by the general population, but by health professionals as well. The psychological effects of the constant struggle with weight and society can often lead to low self-esteem and depression.[5,7] These societal pressures on thinness have also led to unwarranted dieting and eating disorders. While 12% of adolescents are considered obese (a number that has doubled in the past 10 years), national reports claim that nearly 80% of female and 67% of male high school students report "trying to lose weight."[8] In Rhode Island, these figures are 63% and 25%, respectively.[9] Eating disorders are at an all-time high among adolescents and adults. Anorexia nervosa and anorexia bulimia are serious issues in junior high, high schools, and colleges as teens desperately seek the "perfect" body. Although prevention is the key to controlling obesity, the messages may need rewording, especially among youth. On the other extreme, binge eating is common among obese individuals, although it is less understood than the restrictive disorders.[10]

Table 1: BMI Categories

BMI Category	Health Risk Based on BMI	Risk Adjusted for Presence of Comorbid Conditions and /or Other Risk Factors
<25	Minimal	Low
25 - <27	Low	Moderate
27 - <30	Moderate	High
30 - <35	High	Very High
35 - <40	Very High	Extremely High
40+	Extremely High	Extremely High

Source: Guidance for Treatment of Adult Obesity [11]

Abbreviations Used:

BMI	Body mass index
NHANES	National Health and Nutritional Examination Survey

Approximately 40% of women and 23% of men are trying to lose weight at any point in time - spending over $30 billion annually on weight treatment. At the same time, obesity has soared. As a health professional, what is the advice and guidance to give? At what point does a primary care provider intervene?

Obesity Defined

Obesity is defined as an excess of body fat. However, without body mass measurement tools, obesity can be determined using body mass index (BMI), calculated by dividing body weight in kilograms by height in meters squared (BMI = kg/m^2). (This measurement is inappropriate for use among growing children, adolescents, the elderly, and persons with excess lean body mass, such as professional athletes or body builders.) Optimal BMI falls between 25 and 27. The National Center for Health Statistics has defined obesity as a BMI of 27.8 or higher in men, 27.3 or higher in women. Table 1's guidelines were devised by "Shape Up America!" and the American Obesity Association as a guide for physicians.[11] Health risks associated with obesity increase significantly and proportionately with an increase of BMI above 27.[12] In the literature, the terms overweight and obesity are used interchangeably.

Other Assessments

Once a patient is identified as a possible candidate for weight loss, determine whether other conditions that increase health risks are present: hypertension, coronary heart disease, hypercholesterolemia, diabetes mellitus, gallbladder

TABLE 2: Readiness for Change

1. Does the patient say she or he is interested in losing weight?
2. If the patient is a veteran of many attempts to lose weight or are there other significant life issues that will interfere with effort required?
3. Is it an appropriate time to lose weight or are there other significant life issues that will interfere with the effort required?
4. Does the patient sound ready to make a long-term commitment to a new lifestyle of healthful eating and regular physical activity?
5. Has your patient recently gained ten or more pounds, even though his or her health risk is minimal?
6. Is your patient's degree of obesity such that it is impacting quality of life? For example, are mobility, discrimination, or self-esteem issues?

Source: Guidance for Treatment of Adult Obesity[11]

disease, respiratory disease, sleep apnea, or osteoarthritis.[13] Consider the patient's waist-to-hip ratio (>1.0 in males and >.8 in females); progressive weight gain since adolescence; individual and family history of obesity; eating disorders; depression, anxiety, and stress; sexual and physical abuse; menopause; smoking cessation; or overall disease burden. One last assessment to determine the appropriateness to weight loss is the patient's readiness to change behavior. This may be the most important.[11,14] Table 2 lists some questions to determine a patient's readiness.

Temporary or permanent exclusions from weight reduction may include one or more of the following conditions:[11]

Temporary Exclusions:
- Pregnancy
- Lactation
- Unstable mental illness
- Unstable medical conditions

Possible Exclusions (case-by-case basis):
- Cholelithiasis
- Osteoporosis

Permanent Exclusions:
- Anorexia nervosa
- Terminal illness

Prevention

The prevention of obesity may be considered more important than the treatment. A patient who does not show signs of weight gain should be encouraged to practice healthy lifestyle behaviors to prevent weight gain with age. Some recent studies have demonstrated a benefit to maintaining a healthy weight throughout life. This is in contrast to possible adverse effects of weight loss later in life or weight cycling. However, further research is needed in this area.[15,16,17] Those patients who are diagnosed between moderate and extremely high risk, but who are not ready to attempt weight reduction, should also be encouraged to maintain their current weight and prevent further weight gain. Participation in intervention to improve their readiness is recommended.

Treatment Options

The fundamentals to weight loss are setting an appropriate BMI goal, achieving an energy deficit, and establishing permanent lifestyle changes. Success can no longer be defined solely by weight loss, but should include the long-term improvement of medical and psychological conditions, such as hypertension, diabetes mellitus, hyperlipidemia, and depression. Short-term success can be defined by a decreased reliance on medications, increased physical activity, reduced fat intake and a more nutrient-rich diet, and a reduction in psychological distress. Even small weight losses have been found to improve existing comorbid diseases and conditions and improve the quality of life. Scientific evidence strongly suggests that even small weight losses can improve existing comorbid diseases and conditions. These will persist if the modest weight loss is maintained. If weight loss is to be used for a measure of success, it should be the maintenance of loss after five years.[4,11,18] If you choose to set a target BMI, a range of 20- 27 is appropriate for healthy

TABLE 3: Treatment Options

Health Risk	Treatment Option(s) Available
Minimal and Low	• Healthful eating and/or moderate deficit diet • Increased physical activity • Lifestyle change strategies
Moderate	• All of the above plus low calorie diet
High & Very High	• All of the above plus pharmacotherapy
Extremely High	• All of the above plus very low calorie diet

Source: *Guidance for Treatment of Adult Obesity*[11]

patients with a starting BMI <30. A target loss of 2 BMI units below starting BMI is more realistic for all others. This includes those with an initial BMI =>30 who may have a long history of overweight.[11]

The Guidance for Treatment of Adult Obesity (Table 3) tailors treatments to the patient's health risk. They range from healthful eating, increased physical activity, and lifestyle change strategies for individuals who are at a minimal or low health risk to surgical intervention in combination with these three treatments for those at extremely high risk. The patient and provider are advised to discuss related factors such as cost, merits, availability, and compatibility with the person's lifestyle and commitment to change.[11] These approaches may result in rapid weight loss and weight fluctuations. We must remind ourselves that success can no longer be defined by weight loss.

Primary Care Provider's Role

In the *Guidance for Treatment of Adult Obesity*, C. Everett Koop, MD, former United States Surgeon General and Chairman and Founder of *Shape Up America!* urges primary care providers "to foster a positive and supportive therapeutic relationship with (their) overweight and obese patients." He reminds those who treat obese patients that not all overweight people are the same, and the impact of the condition will differ. Providers are encouraged to talk with patients about their feelings about their weight, weight reduction or weight maintenance efforts. Providers should work in partnership with patients to address weight issues and support positive lifestyle changes.[8] As part of this process, the primary care provider and patient must assess the optimal form of treatment. Self-help strategies, a registered dietitian or licensed nutritionist, an exercise physiologist, or a psychological professional may also counsel on behavior and lifestyle changes. Other options may include self-help, commercial weight loss programs, very low-calorie diets, comprehensive multidisciplinary specialized weight management programs, pharmacological treatments, and surgery. If a patient recognizes the weight problem, but is not ready to change, weight maintenance strategies should be discussed.

Obesity is a national epidemic. It has also been described as an incurable chronic disease.

The primary care provider is strongly encouraged to work with the patient in choosing an appropriate channel. The goals of the program must be in line with the goals of the patient. Because weight loss treatments are associated with weight regain, the obese patient should receive continuing care. The more successful approaches have included long-term weight-loss maintenance programs, continuous contact with a primary care provider, and regular exercise.[11,19]

Although evidence of the failure of quick weight loss is not hard to find, there is very little in the research literature on specific weight loss programs. However, in June, 1993 *Consumer Reports* summarized the results of a survey on weight-loss programs. Their 1992 Annual Questionnaire queried readers who had tried to lose weight at least once during the previous three years. Of 95,000 respondents, 19,000 reported joining professionally managed weight-loss programs. The *Report* compared eight commercial programs with moderate-calorie restriction (*Weight Watchers, Jenny Craig, Physicians' Weight Loss, Diet Center,* and *Nutri-System*) and VLCD's (*Health Management Resources [HMR], Optifast,* and *Medifast).*, self-help and hospital-based programs.[20]

This admittedly non-representative survey found that "the average dieter gained back almost half of the weight loss after six months and two-thirds after two years." When looking solely at weight loss, none of the programs excelled. Although weight loss was greatest on the VLCD's, regain was seen at roughly the same rate with all programs. None of the commercial programs emphasized exercise. Consumers reported dissatisfaction with some of the programs' unexpected costs, high fees, and aggressive sales strategies. Consumer satisfaction was best with self-help, hospital-based programs, Weight Watchers, and HMR. Overall, the results of the study were not optimistic; however, approximately 25% of respondents maintained a healthier weight after two years. A study at the Miriam Hospital demonstrated more encouraging results. Subjects participated in a medically supervised multidisciplinary program which utilized a liquid diet protocol.[20] After 18-24 months, 29% had maintained their entire weight loss, 12% gained everything back, and the remainder kept some to most of the weight off.[22] Therefore, a weight-loss program may be appropriate for some. This may be especially true if support from the primary care provider is maintained.[20]

Diet, Physical Activity, and Lifestyle Changes

All treatments should emphasize diet, physical activity, and lifestyle changes. Weight loss results from an energy deficit. Energy expenditure from resting metabolic rate, thermic effect of food, and physical activity must exceed energy intake. To achieve this, a person has one of three options: reduce caloric consumption, increase physical activity, or both. The first option that relies solely on caloric restriction has had the least successful long-term outcome.[4] Therefore, programs increasingly emphasize exercise. Although exercise alone can result in weight losses, change in diet is also encouraged. Reducing fat and increasing nutrient-rich foods (fruits, vegetables (including beans), and whole grains) contribute to weight loss, as well as help prevent and control chronic diseases and conditions.

Self-help and medically-unsupervised programs should, in most cases, not reduce caloric consumption below 800 calories per day. Intake between 800 and 1200 calories may require dietary supplements and professional supervision.

Moderate caloric consumption (above 1200 for females and 1500 for males) and physical activity are recommended. Consumption above these levels will vary from individual to individual depending on initial weight and health risk. Physical activity should be increased progressively up to one hour of moderate-intensity exercise (e.g., brisk walking) accumulated over the course of a day. As a person becomes more physically fit, s/he can partake in more vigorous activities.[22] Success requires making changes in lifestyle: planning the day differently, choosing different restaurants, taking on new hobbies, and changing routine activities.

Conclusions

Although the formula appears simple, for many it can be overwhelming. The sole purpose of food is no longer survival. It accompanies loneliness, depression, and celebration. Each year hundreds of new products are put on supermarket shelves. In America, we can eat anything, at any time day or night, relatively inexpensively. We are a society on the move. We are no longer hardworking farmers. For many, fast food has become the alternative to home-cooked meals. We are a society with technology that conserves our energy. We are accustomed to moving sidewalks, remote controls, drive-thru banks, washers, dryers, pizza delivery, e-mail, and elevators. Few roads invite the bicyclist or pedestrian. Fitting fruits, vegetables, and whole grains into our diet and fitting in the time to walk have become a near impossible task. At the same time we are bombarded by thinness, as fashion models and Hollywood dictate a tall, thin, toned body.

People must be reminded that we are not all supposed to wear a size 6. As we have differences in hair color and height, our body shapes will also differ. Patients should be advised how they can adjust their lifestyle to accommodate a healthy diet and exercise. Obesity should be treated like all other chronic diseases and conditions, with continuous support and treatment. Attaining improved physical and mental health is the goal.

References

1. National Center for Health Statistics. *Third National Health and Nutrition Examination Survey, 1988-94.* Hyattsville, Maryland: US Department of Health and Human Services, Public Health Service, CDC, 1994; DHHS publication no. (PHS) 94-1308.
2. Rhode Island Department of Health. *Behavioral Risk Factor Surveillance System.* Providence, RI: Rhode Island Department of Health, 1995.
3. US Department of Health and Human Services, Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention and Objectives.* DHHS Publication No. (PHS) 91--50212. Washington, DC: US Government Printing Office; 1991.
4. Atkinson RL. Proposed standards for judging the success of treatment of obesity. *Ann Internal Med* 1993;119:677-680.
5. Cassell J. Social anthropology and nutrition: a different look at obesity in America. *JADA* 1995;95:424-427.
6. Kuczmarski RJ. Prevalence of overweight and weight gain in the United States. *Am J Clin Nutr* 1992;55(suppl):495S-502S.
7. Polivy J. Psychological consequences of food restriction. *JADA* 1996;96:589-592.
8. Serdula MK, Collins ME, Williamson DF, et al. Weight control practices of US adolescents and adults. *Ann Internal Med* 119;7:667-671.
9. Rhode Island Department of Education. *1995 Rhode Island Youth Risk Behavior Survey. Summary Report.* Providence, RI: Rhode Island Department of Education; 1995
10. Wilson GT. Relation of dieting and voluntary weight loss to psychological functioning and binge eating. *Ann Intern Med* 119;7:727-730.
11. *Shape Up America!* and American Obesity Association. *Guidance for Treatment of Adult Obesity.* Bethesda, MD: Shape Up America, 1996
12. Manson JE, Willet WC, Stampfer MJ, et al. Body weight and mortality among women. *N Engl J Med* 1995;333:677-685.
13. Pi-Sunyer XF. Medical hazards of obesity. *Ann Intern Med* 1993;119:655-660.
14. Prochaska JO, DiClemente, CC. Towards a comprehensive model of change. In: Miller, W, Heather, N eds. *Treating Addictive Behaviors.* New York, NY: Plenum Press, 1986.
15. Higgins M, D'Agostino R, Kannel W, et al. Benefits and adverse effects of weight loss: observations from the Framingham study. *Ann Internal Med* 1993;119:758-763.
16. Blair S, Shaten J, Brownell K, et al. Body weight, all-cause mortality, and cause-specific mortality in the Multiple Risk Factor Intervention Trial. *Ann Internal Med* 1993;119:749-757.
17. Andres R, Muller DC, Sorkin JD. Long-term effects of change in body weight on all-cause mortality. *Ann Internal Med* 1993;119:737-743.
18. Robison JI, Hoerr SL, Petersmarck KA, et al. Redefining success in obesity intervention: The new paradigm. *JADA* 1995;95:422-423.
19. Wadden TA. Treatment of obesity by moderate and sever caloric restriction: results of clinical research trials. *Ann Internal Med* 119;7:688-693.
20. Rating the diets. *Consumer Reports* June, 1993:354-357.
21. DePue JD, Clark, MM, Ruggiero L, et al. Maintenance of weight loss: a needs assessment. *Obesity Res* 1995;3:241-248.
22. Summary: weighing the options - criteria for evaluating weight-management programs. *JADA* 1995;95:96-105.

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Exercise in Weight Management

Bernardine M. Pinto, PhD, and Lynda Szymanski, MA

In the United States 31% of men and 35% of women are over 20% of desirable body weight,[1] with higher rates in some subgroups (60% of African American women[2]). Obesity is a risk factor for hypertension, cardiovascular disease (particularly, upper-body obesity), non-insulin dependent diabetes mellitus, and other chronic diseases.[3] Related problems include gallstones, osteoarthritis, sleep apnea, greater risk for colorectal and prostate cancers in men, and endometrial and cervical cancers in women.[4] Treatment of obesity-related chronic diseases costs $40 billion annually.[5]

Obesity is a multi-factor disorder with genetics, resting metabolic rate, fat cells, caloric intake, eating habits and physical activity implicated in its etiology.[6] This, in turn, has led to the call for multi-disciplinary treatments.[7] Exercise is a key component in successful weight loss programs.

This paper briefly reviews the research on the effectiveness of exercise in weight loss and its maintenance, and examines the ways physicians can help obese patients to increase their participation in exercise.

While some studies have demonstrated that obese adults are less physically active than their non-obese peers,[8] the data are not consistent.[9] Additionally, it is unclear whether or not obesity causes inactivity. Exercise, particularly aerobic exercise, was introduced into behavioral weight management programs[10] on the premise that individuals must gradually alter maladaptive eating and sedentary behaviors, replacing them with healthy eating and exercise habits to lose weight and maintain loss.

Abbreviations Used:

BMI Body mass index

The mechanisms by which exercise is hypothesized to spur weight loss include physiological pathways (e.g., increased caloric expenditure, increased metabolic rate, reduced appetite, increased lean body mass) and psychological factors (e.g., increased sense of accomplishment, developing appropriate coping skills). However, not all these mechanisms have received empirical support. For example, the clinical significance of post-exercise increases in energy expenditure remains controversial.[11] Exercise does not appear to alter resting metabolic rates directly, but may do so via changes in body composition in moderately obese exercisers.[9,12]

Exercise also is considered to promote weight loss by preventing the loss of fat-free mass and adipose tissue that occurs during caloric restriction. During a fasting state, the amount of lean muscle lost may approach 50% of the total weight loss.[13] The decline of lean tissue begins within 48 hours of caloric restriction and may exceed 20% in as little as two weeks.[14] In a review of 54 studies on the effects of exercise alone on weight loss,[15] lean body mass was preserved or increased (with an average reduction of 1.6% of body fat) following regimens of aerobic exercise (41 studies) or weight training (13 studies). Training duration ranged from 6-104 weeks across these studies. Hence, it appears that exercise affects body composition during weight loss.

Most controlled studies show modest weight losses of 2-3 Kg. in exercise groups compared to control groups.[11] Studies that included exercise plus diet yielded an average loss of 8.5 Kg.[11] Average loss in the diet alone condition averaged 6.7 Kg. When variations in dietary restriction are considered, the effectiveness of exercise varies inversely with the level of caloric restriction. In short, it appears that exercise training alone results in modest decreases in total and fat weight and small increases in lean body weight. The modest weight losses associated with exercise alone can be both confusing and disappointing, given the support for exercise in weight loss programs.

In evaluating the benefits of exercise, one must consider the degree of obesity:[16] a five pound loss is consequential to an individual weighing 130 pounds but not to someone weighing 200 pounds. Additionally, for a sound evaluation, it is important to provide exercise training for a length of time because many sedentary, obese individuals are so unfit they cannot exercise at a level that sustains caloric expenditure. Hence, after a conditioning period to increase fitness levels, exercise can increase caloric expenditure. Further, most studies that evaluated the role of exercise alone did not control for dietary and other changes in daily activity (e.g., an individual may eat more, or reduce routine physical activity because s/he started exercising).

Table 1

Stage	Behavior	Physician's Role
Precontemplation	Not intending to exercise	• Discuss benefits of exercise.
Contemplation	Intending to exercise	• Discuss benefits of exercise. • Address barriers to initiation.
Preparation	Exercising but not at goals	• Provide information on how to exercise. • Address barriers to exercise.
Action	Regular exercise for < 6 months	• Reinforce exercise behavior. • Encourage maintenance. • Help prepare for lapses.
Maintenance	Regular exercise for ≥ 6 months	• Reinforce exercise behavior. • Encourage maintenance. • Help prepare for lapses.

Notwithstanding the difficulties in evaluating the role of exercise alone in weight loss, the improvements in body composition, cardiovascular functioning, and psychological well-being (e.g., sense of accomplishment at being able to exercise even at levels below those needed to produce a physiological effect, reduced anxiety and tension) make a strong case for including exercise in a weight management treatment. Recent data suggest that exercise appears to compliment dieting by increasing dietary adherence.[17] Indeed, successful weight loss programs use moderate to severe caloric restriction, with a focus on improving nutrition and exercise behaviors.[18] Patients should know that regular exercise not only contributes to weight loss but can improve overall health. Modest weight losses - even 10% of body weight - have improved glycemic control, reduced blood pressure, and reduced cholesterol.[19] Patients also should know that the largest reduction in risk (particularly, cardiovascular risk) may accrue when they move from very low to moderate levels of exercise, not when they become extremely active.[20,21]

While behavioral interventions tend to help people lose weight, the majority of people regain the weight within a few years. Many research investigations have compared those who maintain weight loss and those who regain the weight. The best predictor of long-term maintenance is participation in regular, aerobic exercise:[22] Those who engage in regular, aerobic exercise maintain the weight loss for longer periods than those without a regular exercise routine. This has been found in people who lost weight in an unstructured setting[23] and those who participated in a medically-supervised very low calorie diet.[24]

Exercise results in several changes that contribute to weight loss maintenance. First, regular aerobic activity leads to an increase in muscle mass which generates a more efficient metabolism. Second, the energy expended during the exercise activity decreases the likelihood of weight regain. Third, those who exercise tend to perceive that they have a higher energy level than those who do not exercise. [25] This perception might lead to their generally higher activity level. Brownell[22] has postulated that the improvements in self-esteem, body-image satisfaction, and mood that result from regular aerobic exercise help explain the relation between exercise and weight control.

Since there is ample evidence that those who engage in regular, aerobic activity are more likely to maintain their weight loss than those who are relatively inactive,[25] weight loss/maintenance programs should encourage patients to establish and maintain an exercise program.

Research has demonstrated that those who engage in regular, aerobic exercise maintain the weight loss for longer periods than those who do not have a regular exercise routine.

The Exercise Program

Before beginning an exercise program, patients should have a physical examination. In our program, each patient undergoes a stress test and once cleared, receives an exercise prescription developed by an exercise physiologist.

Even if the patient has been cleared of medical contraindications for exercise, s/he may not be psychologically ready. (See Clark and Forsyth, "Counseling Strategies," this issue) Table 1 lists the stages of readiness, with concomitant strategies. The physician must recognize the person's motivational readiness and tailor the intervention to it.[26]

Given that people tend to cycle through the stages of change rather than remain in one stage, a patient who reported exercising one month will not necessarily exercise the next month. Often, patients who regress feel guilty or ashamed.[27] The physician may be able to encourage the patient to consider reinitiating an exercise program. Physicians can influence patients' behavior; tailoring the intervention to the patient's level of readiness is likely to increase the probability that the patient will respond and reduce the physician's frustration with sedentary patients.

Although most people have some knowledge about the benefits of exercise, many people, especially the obese, lead sedentary lives. Many obese people are physically unfit; for them, aerobic exercise at high intensity is difficult and painful, if not impossible.[28] Many believe, erroneously, that they must engage in least 30 minutes of aerobic activity to benefit. Because they cannot, they remain sedentary. Physicians can dispel this myth by telling patients about the benefits of low intensity exercise. In considering moderate levels of exercise, both structured exercise and lifestyle activity are important for weight management. The typical exercise prescription includes aerobic activity for at least 20 minutes at least three days a week at an intensity sufficient to spend at leadt 300 Kcal. per session.[29] Recognizing the role of moderate lifestyle activity,[30] investigators have found that diet with increased lifestyle activity (e.g., parking further away from stores, taking the stairs instead of the elevator) is as effective as diet plus programmed exercise in the short-term and is more effective over the long term (in children[31]). In a recent study,[32] 56 obese women (BMI=33.9+/-4.1) were placed on a restricted diet (1200-1500 Kcal.) and randomized into two forms of exercise: short bouts of 10 minutes several times a day versus a single long bout. Both groups were required to exercise (primarily walking) five days per week for 20-40 minutes (the total duration of exercise was increased gradually over the 20 week program). The women exercising in multiple short bouts showed higher adherence to exercise, reported more days of exercise and greater total duration of exercise, greater weight loss (-8.9kg +/-5.3 vs. -6.4kg +/-4.5), and lowered caloric intake.

Lifestyle activities are suited for people who are less motivated for structured, programmed exercise. Simple, everyday activities (e.g., gardening, walking) are not prohibitively expensive, and do not require individuals to use health clubs and gyms that may be intimidating to the obese. Unlike pro-

grammed exercise, these activities are flexible, and convenient. Furthermore, many overweight, unfit individuals may not be able to participate in long bouts of exercise (even at moderate intensity). With improvements in fitness, the duration and intensity of exercise sessions could be increased thereby increasing caloric expenditure. Hence, obese individuals should be encouraged to increase their energy expenditure both in programmed exercise and in their daily routine.

Summary

Exercise is integral to successful weight loss and maintenance. When talking to patients about exercise, consider their readiness, and address the barriers that prevent exercise. Physicians can help those patients who already exercise by encouraging them to continue and helping them anticipate, and recover from, lapses. Providing resource material to patients on behavioral strategies for exercise adoption and weight management can supplement the physician's efforts.[33,34] Overall, patients need to hear that any regular exercise, be it step-aerobics, walking, or taking the stairs, will benefit them.

References

1. Kuczmarski RJ, Flegal KM, Campbell SM, Johnson CL. Increasing prevalence of overweight among U.S. adults: The National Health and Nutrition Examination, 1960 to 1991. *JAMA* 1994;272:205-211.
2. Van Itallie TB. Obesity: The American disease. *Food Technology* 1985;43-47.
3. Pi-Sunyer FX. Health implications of obesity. *Am J Clin Nutr* 1991;53: 1595S-1603S.
4. Stunkard AJ. Current views on obesity. *Am J Med* 1996;100:230-236.
5. Colditz GA. Economic costs of severe obesity. *Am J Clin Nutr* 1992;55: 503S-507S.
6. Brownell KD, Wadden TA. Etiology and treatment of obesity: Towards understanding a serious, prevalent, and refractory disorder. *J Consult Clin Psychol* 1992;60:505-517.
7. Clark MM, Ruggiero L, Pera V, et al. Assessment, classification, and treatment of obesity: A behavioral medicine perspective. In: Stoudemire A & Fogel BS, eds. *Psychiatric Care of the Medical Patient.* New York: Oxford University Press; 1993:903-926.
8. Brownell KD, Stunkard A, Albaum JM. Evaluation and modification of exercise patterns in the natural environment. *Am J Psychiatry* 1980;137: 1540-1545.
9. Bray GA. Exercise and obesity. In: Bouchard C, Shephard RJ, Stevens T, et al. eds. *Exercise, Fitness and Health: A Consensus of Current Knowledge.* Champaign, Il: Human Kinetics; 1990.
10. Stuart RB. Behavioral control of overeating. *Behav Res Ther* 1967;5:357-365.
11. King AC, Tribble DL. The role of exercise in weight regulation in nonathletes. *Sports Med* 1991;11:331-349.
12. Segal KR, Pi-Sunyer FX. Exercise and obesity. *Med Clin North Am* 1989; 73:217-236.
13. Garrow JS. Energy balance in man-an overview. *Am J Clin Nutr* 1987;45: 1114-1119.
14. Bray G. *The Obese Patient.* Philadelphia, Saunders; 1976.
15. Wilmore JH. Appetite and body composition consequent to physical activity. *Res Q Exerc Sport* 1983;54:415-425.
16. Blair SN. Evidence for success of exercise in weight loss and control. *Annals Intern Med* 1993;119:702-706.
17. Rodin J, Plante TG. The psychological effects of exercise. In: Williams RS & Wallace A, eds. *Biological Effects of Physical Activity.* Champaign, Il: Human Kinetics; 1989:127-137.
18. Blix GG, Blix AG. The role of exercise in weight loss. *Behav Med* 1995;21:31-39.
19. Goldstein DJ. Beneficial health effects of modest weight loss. *Int J Obes* 1992;16:397-415.
20. Blair SN, Kohl HW, Paffenbarger RS, et al. Physical fitness and all-cause mortality: A prospective study of healthy men and women. *JAMA* 1989;262:2395-2401.
21. Wood PD, Stefanick ML, Williams PT, Haskell WL. The effects on plasma lipoproteins of a prudent weight-reducing diet, with or without exercise, in overweight men and women. *New Engl J Med* 1991;325:461-466.
22. Brownell KD. Exercise in the treatment of obesity. In: Brownell KD & Fairburn CG, eds. *Eating Disorders and Obesity: A Comprehensive Handbook,* New York, NY: Guilford Press; 1995:473-478.
23. Kayman S, Bruvold W, Stern JS. Maintenance and relapse after weight loss in women: Behavioral aspects. *Am J Clin Nutr* 1990;52:800-807.
24. DePue JD, Clark MM, Ruggiero L, et al. Maintenance of weight loss: A needs assessment. *Obes Res* 1995;3:241-248.
25. Foreyt JP, Goodrick GK. Factors common to successful therapy for the obese patient. *Med Sci Sports Exerc* 1991;23:292-297.
26. Marcus BH, King TK, Clark MM, et al. Theories and techniques for promoting physical activity behaviours. *Sports Med* 1996;22:321-331.
27. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change: Applications to addictive behaviors. *Am Psychol* 1992;47:1102-1114.
28. Wilfley DE, Brownell KD. Physical activity and diet in weight loss. In: Dishman RK, ed. *Advances in Exercise Adherence.* Champaign, IL: Human Kinetics; 1994:361-393.
29. American College of Sports Medicine. Position stand: The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness in healthy adults.*Med Sci Sports Exerc* 1990;22:265.
30. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health: A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273:402-407.
31. Epstein LH, Wing RR, Koeske R, et al. A comparison of lifestyle change and programmed aerobic exercise on weight and fitness changes in obese children. *Behav Ther* 1982;13:651-665.
32. Jakicic JM, Wing RR, Butler BA, Robertson RJ. Prescribing exercise in multiple short bouts versus one continuous bout: Effect on adherence, cardiorespiratory fitness and weight loss in overweight women. *Int J Obes* 1995;19:893-901.
33. Brownell KD. The LEARN Program for Weight Control, 6th ed. Dallas, Texas: American Health Publishing Company; 1994.
34. Blair SN. Living with Exercise: Improving your Health through Moderate Physical Activity. Dallas, TX: American Health Publishing Company; 1991.

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Sexual Abuse and Obesity: Implications for the Treatment of Obesity

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Recent research suggests that a history of sexual abuse is associated with an increased likelihood of becoming obese. In addition, a history of sexual abuse may make obesity, a recalcitrant and refractory problem, even more difficult to treat. This paper reviews the literature on the relationship between obesity and sexual abuse, examines the impact of a history of sexual abuse on obesity treatment outcome, and highlights the implications for obesity treatment with sexual abuse survivors.

Rates of sexual abuse in the general female population range from 10 to 70% depending on the criteria.[1,2] Research indicates that sexual abuse survivors experience negative psychological sequelae such as mood disorders,[3] drug and alcohol abuse,[4,5] somatically based stress disorders,[6] and personality disorders.[7,8] In addition, many survivors report feelings of vulnerability,[4,9] dissatisfaction with or avoidance of sexual relationships and disrupted marriages.[10] Sexual abuse also appears to have consequences for physical health. For example, Golding found sexual assault to be associated with physical disability, diabetes, arthritis, and a variety of somatic symptoms.[11]

Abbreviations Used:

BMI	Body mass index
VLCD	Very low calorie diet
WEL	Weight Efficiency Lifestyle questionnaire

Several studies suggest an association between a history of sexual abuse and obesity.[12-15] Felitti[12] compared individuals from a general medical practice who answered "yes" to "Have you ever been raped or sexually molested?" (96% female) to controls (who answered "no"), matched for sex and age: the abused group was significantly more likely to experience marital instability, experience certain psychosomatic symptoms, suffer from depression, utilize health care resources, and be morbidly obese. The abused group was four times as likely as the control to be more than 100 pounds overweight. Thus a history of sexual abuse may be a risk factor for becoming significantly overweight.

There is limited information regarding the prevalence of sexual abuse in obese populations. The few germane studies suggest an increased prevalence of sexual abuse in obese, compared to nonobese, individuals.[3,16] For example, Felitti[3] compared 100 obese individuals seeking treatment to a general community sample of 100 always-slender adults to examine obesity's linkage to other life events. He found 25% of obese adults reporting a history of sexual abuse compared to 6% in the control sample.

Given the high rates of sexual abuse in the general population, the association between sexual abuse and psychiatric co-morbidity, and the prevalence of sexual abuse in an obese population seeking treatment, a history of sexual abuse may be an important variable in obesity treatment. Weight loss treatment providers should consider that individuals with a history of sexual abuse may become uncomfortable with their body as their appearance becomes more attractive to the opposite sex through weight loss and therefore they may discontinue treatment. In support of this hypothesis, Felitti[3] reported that one-third of applicants to a very-low-calorie diet (VLCD) program identified using obesity as a defense against sexual proposals or to reduce spousal jealousy. Additionally, weight loss may trigger memories, flashbacks or nightmares as individuals return to a weight at which they were abused, or secondary to feelings of vulnerability.[17]

Recent data indicate that a history of sexual abuse is adversely related

Table 1

Differences between patients reporting or not reporting childhood sexual abuse

	Sexual Abuse	No Sexual Abuse
Total Sessions Attended	14.0	17.9
% Nonadherence Episodes*	24.8	12.8
Weight Loss (kg)*	15.3	23.5
Psychiatric History (%)*	72.7	40.9
Self-Efficacy[1]		
Negative Emotions*	11.8	20.9
Availability	18.8	24.4
Social Pressure	25.6	27.7
Physical Discomfort*	22.3	28.1
Positive Activities	22.4	27.6
Total WEL Score*	98.9	126.3

[1] As measured by the Weight Efficacy Life-Style Questionnaire (WEL; Clark, abrams, Niaura, Eaton & Rossi, 1991) which consists of 20 likert-type items that asks subjects to rate their self-efficacy for controlling their eating in various situations. Lower scores represent less self-efficacy.

* $p \leq .05$

to treatment outcome for obesity. King and colleagues[18] examined whether a history of sexual abuse affected obesity treatment outcome variables such as adherence with the treatment protocol, attendance, and weight loss at the end of treatment. Subjects were drawn from consecutive female enrollments in a multidisciplinary weight management program that combined behavior therapy and a very-low-calorie- diet (VLCD)). Twenty two subjects who reported a history of sexual abuse were compared to 22 subjects matched for body mass index (BMI), sex, and age who denied a history of sexual abuse. Subjects reporting a history of sexual abuse lost significantly less weight than subjects who denied sexual abuse, 15.2 kg versus 23.5 kg. Attendance rates did not differ significantly. However, subjects with a history of sexual abuse were more likely to be nonadherent. (Table 1).

Psychological variables suggest explanations for the inter-group differences. Individuals with a history of sexual abuse were significantly more likely to have experienced psychological distress as evidenced by increased rates of psychiatric treatment. This concurs with studies finding increased rates of sexual abuse in psychiatric patients.[1] Women with a history of sexual abuse also reported significantly less self-efficacy or confidence to control their eating, especially with situations involving negative affect and physical discomfort. The difference for negative emotions suggests that individuals with a history of sexual abuse are less able to manage their eating when experiencing psychological distress. The weight loss itself could promote depressive symptoms resulting in decreased self-efficacy and more nonadherence. As these individuals lose weight they may feel uncomfortable, especially if they perceive their bodies as having less "protection," making them more vulnerable to future abuse.[19] This is especially salient for a VLCD since the weight loss can be rapid and therefore allows less time for individuals to adjust to changes in their bodies. Women with a history of sexual abuse also reported significantly less confidence to control their eating when experiencing physical discomfort. Since individuals who have been sexually abused are more likely to experience somatic difficulties,[6] and have less confidence to control eating, compliance with an obesity treatment program may be difficult. This study provides evidence that assessing for a history of sexual abuse is important for obesity treatment programs. Results suggest that a history of sexual abuse is an important pretreatment variable which influences the outcome of obesity treatment.

Subjects reporting a history of sexual abuse lost significantly less weight [in a weight reduction program] than subjects who denied sexual abuse.

While a history of sexual abuse may presage poorer outcome for obesity treatment, preliminary data suggest that treatment for the sexual abuse can improve results. King and colleagues[20] conducted a follow-up study to determine how sexual abuse treatment affects weight loss treatment outcome. Twenty subjects who received or were in adjunctive treatment for past sexual abuse were compared to twenty subjects who had not received treatment for their sexual abuse, matched for age and BMI. It was hypothesized that subjects who had sought treatment for the sexual abuse would be less likely to drop out of weight loss treatment and would lose more weight. Results indicated that subjects who reported seeking treatment for the past sexual abuse attended significantly more weight loss sessions: 14.4 vs. 9.0. Differences for weight loss, though in the expected direction, were not significant: 14.9 kg vs. 9.5 kg. Interestingly, women who had received treatment for their sexual abuse reported significantly more binge eating and less confidence to control their eating than women who had not received sexual abuse treatment. Differences between the two groups in self-efficacy for eating were greatest in situations involving negative affect and physical discomfort. In contrast, a significantly greater percentage of women who had not received treatment for their sexual abuse reported having received treatment for substance abuse. Perhaps individuals who seek treatment for their sexual

Table 2

Differences between sexual abuse survivors who received sexual abuse treatment and sexual abuse survivors who had not received sexual abuse treatment

	Treatment	No Treatment
Total Sessions Attended*	14.4	9.0
% Nonadherence Episodes	20.0	29.0
Weight Loss (kg)	14.9	9.5
Psychiatric History Variables		
Binge Eating (%)*	80.0	40.9
Alcoholic Treatment (%)	5.0	20.0
Drug Treatment (%)	10.0	35.0
Self-Efficacy[1]		
Negative Emotions*	8.5	17.9
Availability	18.1	18.3
Social Pressure	23.9	27.3
Physical Discomfort*	21.4	27.1
Positive Activities	21.5	23.8
Total WEL Score*	93.5	114.3

* $p \leq .05$

abuse are more symptomatic than those who do not seek treatment. However, individuals who do not seek treatment for their abuse may be more likely to use substances to cope with symptoms. In short, adjunctive treatment for sexual abuse may improve weight loss treatment outcomes for this population (Table 2).

Future research should further document the results of these studies using a range of samples. Other modalities of weight management should be examined since the rapid weight loss associated with a VLCD may have been responsible for the between group differences; a less restrictive diet, with more gradual weight loss, may produce different results. Research is also needed to examine the effectiveness of therapeutic interventions for obese individuals with a history of sexual abuse. The studies suggest that increasing efficacy to control eating when confronted with negative affect or physical discomfort may be important treatment components of protocols designed to enhance obesity treatment in a population with a history of sexual abuse. Research elucidating factors associated with treatment outcome in obesity is of great value, since this information would allow health care professionals to match individuals to treatment and thereby deliver more effective interventions.

In conclusion, sexual abuse appears to be a risk factor for obesity. In addition, sexual abuse survivors appear to show poorer outcome to obesity treatment than women without abuse histories. While a relationship appears to exist between obesity and sexual abuse, less is known regarding the mechanisms responsible for the relationship. Several possible mediators may help to explain the relationship between sexual abuse and obesity. For example, sexual abuse survivors may perceive their body size as a defense against further abuse. Another possible mediator is increased levels of stress and/or arousal, which may promote eating.[21] Sexual abuse survivors may be eating more because they are experiencing more distress. All of these mechanisms suggest that obesity treatment may need to be tailored for sexual abuse survivors.

References

1. Folsom V, Krahn D, Nairn K, et al. The impact of sexual and physical abuse on eating disordered and psychiatric symptoms. *Int J Eat Disord* 1993;13(3):249-257.
2. Russell D. *The Secret Trauma: Incest in the Lives of Girls and Women.* New York, NY: Basic Books; 1986.
3. Felitti VJ. Childhood sexual abuse, depression, and family dysfunction, in adult obese patients. *South Med J* 1993;86(7):732-735.
4. Browne A, Finklehor D. Impact of childhood sexual abuse: A review of the research. *Psychol Bull* 1986;99:66-77.
5. Bryer JB, Nelson BA, Miller JB, Krol PA. Childhood sexual and physical abuse factors in adult psychiatric illness. *Am J Psychiatry* 1987;144:1426-1430.
6. Nash MR, Hulsey TL, Sexton MC, et al. Long-term sequelae of childhood sexual abuse: Perceived family environment, psychopathology, and dissociation. *J Consult Clin Psychol* 1993;61:276-283.
7. Briere J, Zaidi LY. Sexual abuse histories and sequelae in female psychiatric emergency room patients. *Am J Psychiatry* 1989;146:1602-1606.
8. Brown GR, Anderson B. Psychiatric morbidity in adult inpatients with childhood histories of sexual and physical abuse. *Am J Psychiatry* 1991;144:1426-1430.
9. Goodwin JM, Cheeves K, Connell V. Borderline and other severe symptoms in adult survivors of incestuous abuse. *Psychiatr Ann* 1990;1:22-32.
10. Finklehor D, Hotaling GT, Lewis IA, Smith C. Sexual abuse and its relationship to later sexual satisfaction, marital status, religion, and attitudes. *J Interpersonal Violence* 1989;4:379-399.
11. Golding JM. Sexual assault history and physical health in randomly selected Los Angeles women. *Health Psychol* 1994;3:130-138.
12. Felitti VJ. Long-term medical consequences of incest rape, and molestation. *South Med J* 1991;84(3):328-331.
13. Lechner ME, Vogel ME, Garcia-Shelton LM, et al. Self-reported medical problems of adult female survivors of childhood sexual abuse. *J Fam Pract* 1993; 36:633-638.
14. Lemieux AM, Coe CL. Abuse-related posttraumatic stress disorder: Evidence for chronic neuroendocrine activation in women. *Psychosom Med* 1995;57:105-115.
15. Springs FE, Friedrich WN: Health risk behaviors and medical sequelae of childhood sexual abuse. *Mayo Clin Proc* 1992;67:527-532.
16. Kopp W. The incidence of sexual abuse in women with eating disorders. *Psychother Psychosom Med Psychol* 1994;44:159-162.
17. Clark MM, Ruggiero L, Pera V, et al. Assessment, classification, and treatment of obesity: Behavioral medicine perspective. In: Stoudemire A, Fogel BS, eds. *Psychiatric Care of the Medical Patient.* New York, NY: Oxford University Press; 1993;903-926.
18. King TK, Clark MM, Pera V. History of sexual abuse and obesity treatment: An outcome study. *Addict Behav* 1996;21(3):283-290.
19. Bass E, Davis L. *The Courage to Heal.* New York, NY: Harper & Row; 1988.
20. King TK, Clark MM, Pera V, Medeiros ML. The Impact of Treatment for Sexual Abuse on Obesity Treatment Outcome. Poster presented at the 30th annual meeting of the Association for the Advancement of Behavior Therapy, New York, New York; November, 1996.
21. Rodin J, Wing RR. Behavioral factors in obesity. *Diabetes Metab Rev* 1988;4:701-725.

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Adolescent Obesity: Assessment and Treatment

Elissa Jelalian, PhD, and Elizabeth E. Lloyd, PhD

Despite increased attention to overweight in pediatric populations, the prevalence of obesity continues to rise in children and adolescents.[1] Data from the most recent National Health and Nutrition Examination Survey (NHANES III) indicate that approximately 22% of children and adolescents are overweight as defined by BMI greater than the 85th percentile[2] and approximately 14% of children and 12% of adolescents as defined by BMI greater than or equal to the 95th percentile.[3] This represents an increase from previous national surveys. The Bogalusa Heart Study,[4] a longitudinal assessment of cardiovascular risks associated with childhood obesity, also found an increase in weight of approximately 2 to 3 kg in samples of 5 to 17 year olds between 1973 and 1988. Thus, convergent data document the increased prevalence of adolescent obesity. At the same time, decreasing adolescent obesity has been designated a national health care priority as identified in the Healthy People 2000 objective to "reduce overweight to a prevalence of ... no more than 15% among adolescents aged 12 through 19."[5]

Adolescent obesity can be defined through a number of criteria including percent overweight relative to age, height, and gender, percent body fat, and weight-stature indexes. Relative measures such as weight for age percentiles do not account for height or body fat, while measures of weight for height rely on erroneous assumptions about the distributions of weight and height at a given age.[6] Standardized pediatric growth curves used in the U.S. (the National Center for Health Statistics growth reference curves for 2-18 years) have also been criticized because they typically rely on a statistical definition of "normal" and "overweight". That is, the 95th percentile weight-for-height is commonly used to define overweight. This is problematic to the extent that the population continues to get heavier and the weight at the 95th percentile increases.[7] An expert panel recently recommended that for the purpose of preventive screening, body mass index (BMI; kg/m^2) be used as a marker of adolescent overweight. Specifically, BMI greater than or equal to the 95th percentile for age and sex or absolute BMI > 30 should be used to define overweight in adolescence and be the indicator for more extensive medical evaluation, while BMI greater than or equal to the 85th percentile but less than the 95th percentile be considered at risk.[6] There are now standardized tables available for evaluating adolescent BMI.

Abbreviations Used:

BMI	Body mass index
NHANES	National Health and Nutrition Examination Survery
PSMF	Protein-sparing modified fast

Because adolescence is a time of continued growth, any dietary modification must be aimed at reducing body fat without compromising growth.

Early identification and referral of overweight adolescents are recommended because of the multiple physical and psychosocial risks related to adolescent obesity. The risk of adult obesity is greater in obese than nonobese children, and older children appear to be at greater risk than younger children.[8] Overweight during adolescence is also independently associated with a number of health risks. For example, overweight and percent body fat during adolescence have been associated with cardiovascular risk factors such as elevated blood pressure and cholesterol,[9] as well as increased adult mortality.[10] Long-term follow-up of overweight adolescents through older adulthood indicates that overweight during adolescence is related to increased risk for mortality and morbidity independent of adult overweight status.[11]

There are also a number of psychological risks associated with adolescent obesity. From a developmental perspective, adolescence is a time of identity formation, including the development of body image. Consequently, childhood and adolescence may be a particularly difficult time to be overweight from the perspective of developing a positive sense of one's body. For girls, overweight during childhood and adolescence has been primarily associated with concerns with shape and eating.[12] Recent research has indicated a higher incidence of eating disorder pathology, such as binge eating disorder, in overweight adolescents.[13] Berkowitz[13] found that 30% of a sample of severely obese adolescent girls presenting for treatment were binge eaters. Furthermore, severity of binge eating was positively related to dissatisfaction and depressive symptoms. Obese adolescent girls have been found to be more dissatisfied with their weight and body than nonobese girls, although they were not found to be more depressed.[14] Consistent with the idea that adolescence is a particularly sensitive time for development of body image, there are also some data to suggest that adults who have been overweight through childhood and adolescence do not experience the same improvement in body image following weight loss as those who become overweight as adults.[15] Interestingly, much

of the research in this area has been conducted with girls, leaving a number of questions regarding the psychological adjustment of overweight boys.

The rise in incidence of childhood and adolescent obesity has been attributed to more hours spent in sedentary activities such as TV viewing and computers; less physical activity at home and school; and greater availability and consumption of high fat, high calorie foods.[16] This increase in overweight occurs at the same time that growing numbers of adolescents, particularly females, endorse dieting. Several studies have documented that normal weight girls from preadolescence through adolescence express a desire to be thinner and a concern with becoming overweight .[17,18] There is an apparent dichotomy in our culture, such that both the prevalence of obesity and the focus on weight loss, dieting, and thinness have increased in tandem. Although the direction of this relationship is not clear, it leads to speculation regarding the possible connection between pressures to be thin and weight gain for some adolescents.

Given the prevalence of adolescent obesity, effective treatment options are needed. Good interventions, with long-term efficacy, have been documented for children between the ages of eight and twelve years.[19,20] However, long term success with adolescents and adults has been more difficult to document.[21] Treatment typically includes three major components: dietary modification; exercise prescription; and behavior modification. A recent meta-analysis reviewed data on interventions to reduce overweight in children and adolescents.[22] Overall, treatment had an effect of approximately 1/2 standard deviation, which was superior to results obtained for children assigned to control conditions. In addition, better outcome was obtained for treatments that included behavioral components, such as stimulus control strategies, in addition to diet and exercise. There was no clear advantage found for intensive parent involvement in treatment programs, and age of participants did not significantly affect treatment outcome. While these results are promising, the efficacy of programs targeting adolescents remains somewhat unclear.

Several aspects of treatment with adolescents clearly differ from that with children. Given the developmental changes that occur between childhood and adolescence (e.g. increased cognitive sophistication and self-reliance, separation from parents, increased importance of peer relationships), a different method of treatment delivery is indicated for this older age group.[23] One treatment dimension that has been researched specifically with adolescents is the question of parent involvement. Family participation and involvement have been found to be effective for school age children. Parents are typically enlisted to enforce contingencies, assist with monitoring intake, and encourage compliance with dietary and exercise choices. Studies with adolescents have presented mixed results regarding the impact of parent involvement on treatment outcome. In the meta-analysis noted above, degree of parent involvement was not related to treatment outcome; and the importance of parent involvement was unrelated to the age of participants. Consequently, the most effective role for parents in adolescent weight loss programs remains unclear.

Another question specific to adolescent weight loss programs is the degree of calorie restriction recommended. Because adolescence is a time of continued growth, any dietary modification must seek to reduce body fat without compromising growth. Moderate calorie reductions offer the most conservative approach. Several treatment programs also describe success with medically supervised use of very low calorie diets. Initial use of protein-sparing modified fast (PSMF) or very low calorie diets with adolescents involved close supervision in an inpatient hospital.[24] More recently, Suskind and colleagues[25,26] among others, have extended use of very low calorie diets to outpatient settings with good initial results. In clinical practice, selection of an appropriate level of caloric restriction may involve balancing the faster rate of expected weight loss associated with PSMF with the potential risks to growth. The benefits of very low calorie diets may outweigh the potential risks, particularly for the severely obese.

In summary, adolescent obesity is a significant health problem, with medical and psychological complications. Intervention during childhood and adolescence is clearly indicated, because the longer children remain overweight, the more likely they are to be overweight into adulthood. While interventions for adolescent weight loss continue to evolve, treatments that are currently available have been shown to be successful. Future work in this area needs to address identification of adolescent variables that are related to treatment outcome and the matching of adolescents to specific treatment options.

References

1. Gortmaker SL, Dietz WH, Sobol AM, and Wehler CA. Increasing pediatric obesity in the United States. *AJDC* 1987; 141: 535-540.
2. Troiano RP, Flegal KM, Kuczmarski RJ, et al. Overweight prevalence and trends for children and adolescents. *Archives of Pediatric Adolescent Med* 1995;149: 1085-1091.
3. Update: Prevalence of overweight among children, adolescents, and adults - United States, 1988-1994. *MMWR* 46:199-202.
4. Webber, LS, Harsha DW, Nicklas TA, Berenson GS. Secular trends in obesity in children. In LJ Filer, RM Lauer, & R Luepker (Eds.) *Prevention of arthrosclerosis and hypertension beginning in youth.* (194-203). 1994; Philadelphia: Lea & Febiger.
5. Department of Health & Human Services, Public Health Service. *Healthy People 2000: National Health Promotion and Disease Prevention Objectives.* DHHS Pub. No. (PHS) 91-50212. 1991; Washington, DC: Supt. Of Docs.
6. Himes JH, Dietz WH. Guidelines for overweight in adolescent preventive services: recommendations from an expert committee. *Amer J of Clin Nutr* 1994; 59: 307-316.
7. Yip R. The new growth charts: Implications for our definition of overweight for children. Workshop on prevention and treatment of childhood and obesity: *Res directions.* September 1995. Bethesda, MD.

8. Serdula MK, Ivery D, Coates RJ, et al. Do obese children become obese adults? A review of the literature. *Prev Med* 1993; 22:167-177.
9. Berenson GS, Srinivasan SS, Wattigney WA, Harsha DW. Obesity and cardiovascular risk in children. *Annals of the NY Acad of Sciences* 1993;699:93-103.
10. Nieto FJ, Szklo M, Comstock G. Childhood weight and growth rate as predictors of adult mortality. *Amer J of Epidemiol* 1992;136:201-213.
11. Must A, Jacques PF, Dallal GE, et al. Long-term morbidity and mortality of overweight adolescents: A follow-up of the Harvard Growth Study 1922 to 1935. *New Engl J Med* 1992;327: 1350-1355.
12. Friedman MA, Wilfley DE, Pike KM, et al. The relationship between weight and psychological functioning among adolescent girls. *Obesity Research* 1995; 3:57-62.
13. Berkowitz R. Binge eating, self-concept, and dieting in obese adolescent girls. Workshop on prevention and treatment of childhood and obesity: *Res directions*. September 1995. Bethesda, MD.
14. Wadden TA, Foster GD, Stunkard AJ, Linowitz JR. Dissatisfaction with weight and figure in obese girls: Discontent but not depression. *Int J of Obesity* 1989; 13:89-97.
15. Brownell KD. New developments in the treatment of obese children and adolescents. In AJ Stunkard & E Stellar (Eds.) *Eating and its disorders*. 1984; Raven, NY.
16. McCarty B, Connelly P. Working with overweight children and teens: The parental challenge. *Weight Control Digest* 1993;3:245-247.
17. Moses N, Banilivy MM, Lifshitz F. Fear of obesity among adolescent girls. *Pediatrics* 1989; 83:393-398.
18. Thelen MH, Powell AL, Lawrence C, Kuhnert ME. Eating and body image concerns among children. J of Clin *Child Psychol* 1992; 21:41-46.
19. Epstein LH, McCurley J, Wing RR, Valoski A. Five-year follow-up of family-based behavioral treatments for childhood obesity. *J of Consult and Clin Psychol* 1990; 58: 661-664.
20. Epstein LH, Valoski A, Wing RR, McCurley J. Ten-year follow-up of behavioral, family-based treatment for obese children. *JAMA* 1990; 264: 2519-2523.
21. Wadden TA, Stunkard AJ, Rich L, et al. Obesity in black adolescent girls: A controlled clinical trial of treatment by diet, behavior modification, and parental support. *Pediatrics* 1990; 85:345-351.
22. Haddock CK, Shadish WR, Klesges RC, Stein RJ. Meta-Analysis: Treatments for childhood and adolescent obesity. *Annals of Behav Med* 1994; 16:235-244.
23. Epstein LH, Wing RR. Behavioral treatment of childhood obesity. *Psychol Bull* 1987;101:331-342.
24. Archibald EH, Harrison JE, Pencharz PB. Effect of a weight-reduction high-protein diet on the body composition of obese adolescents. *AJDC* 1983;137:658-662.
25. Figueroa-Colon R, von Almen K, Franklin FA, Suskind RM. Comparison of two hypocaloric diets in obese children. *AJDC* 1993;147, 160-166.
26. Suskind RM, Sother MS, Farris RP, et al. Recent advances in the treatment of childhood obesity. *Annals of the NY Acad of Sciences* 1993; 699:181-199.

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Counseling Strategies for Obese Patients

Matthew M. Clark, PhD, and LeighAnn H. Forsyth, PhD

Multidisciplinary clinical programs frequently report dropout rates of 40%; commercial programs report dropout rates of 70% or higher.[1] Post-treatment relapse rates are high. Thus, researchers and practitioners have sought to identify predictors of long-term success. Different models have been proposed to predict outcome. One promising model is the Transtheoretical Model of Change[2] which incorporates components from a number of health behavior models. The transtheoretical model hypothesizes that individuals move through different stages of change that correspond to different levels of readiness to change, different motivational levels, different levels of self-confidence for change,[3] and different strategies or techniques for change. The transtheoretical model has been successfully applied to a number of behaviors (i.e., alcohol usage, smoking cessation).[4] This article outlines its application to obesity treatment in the health care setting.

Transtheoretical Model: Stage-matched Weight Management Counseling

Most treatment programs assume the individual is ready to change - an assumption that is not always accurate. A recent survey found that only 53% of overweight individuals are trying to lose weight.[5] If these individuals are referred to an action-oriented treatment program, they are likely to ignore the recommendation, prematurely drop out, or not adhere to the protocol. The transtheoretical model of behavior change[6] takes into account all stages of readiness as important components of the change process.

Stages of Change

The first component of the transtheoretical model, the stages of change, are precontemplation, contemplation, preparation, action, and maintenance.[6] Individuals in the precontemplation stage have no intention of losing weight in the next six months. They are likely to believe that their weight is not a problem; or they are discouraged from previous unsuccessful weight loss attempts. Those in the contemplation stage acknowledge the need to reduce their weight and are considering change within the next six months. These individuals, however, are not acting on their intentions and are uncommitted. The preparation stage describes individuals who intend to take the steps necessary for weight loss in the next 30 days. This subset of individuals will benefit most from referral to an action-oriented weight loss program.[7] The action stage denotes the first six months of actual behavior change, when patients start to modify their diet and increase their physical activity. This is the period of greatest risk for relapse, when patients start to modify their diet and increase their physical activity. An individual is considered to be in the maintenance stage after six months of continuous successful action. Maintenance is an active stage of change, because individuals are working on preventing relapse and consolidating their gains.[8,9] (See also "Exercise in Weight Management," by Bernardine Pinto and Lynda Szymanski, this issue).

Processes of Change (Table 1)

To progress through the stages of change, individuals use the second component of the transtheoretical model which are the cognitive and behavioral strategies termed "processes of change." Processes or strategies for weight management include: awareness of health consequences of obesity, discussing feelings about one's obesity, assessing the effect of one's obesity on family, commitment to a specific goal, avoiding eating triggers, increases in physical activity, stress management, therapeutic relationships, and medications.[4] Precontemplators and contemplators of weight loss frequently use more cognitive types of processes, while individuals in action and maintenance primarily use behavioral strategies. Because research indicates that certain processes are associated with specific stages of change, practitioners can more effectively motivate obese patients by matching

Table 1

Processes and Stages of Change for Weight Management

Precontemplation	Contemplation	Preparation	Action	Maintenance
Awareness of health consequences of obesity	Self-evaluation about obesity	Commitment to specific goal		Stress management
Discussing feelings about one's obesity		Avoiding eating triggers		Therapeutic relationships
Assessing effect of one's obesity on family		Increases in physical activity		Rewards for lifestyle changes

*Adapted from Prochaska, DiClemente, and Norcross[2]

Table 2

Stage Matched Obesity Counseling Strategies

Precontemplation
- Discussion of specific adverse health effects of weight for the individual
- Exploration of confidence level

Contemplation
- Discussion of specific benefits of weight loss
- Confidence building

Preparation
- Assistance in treatment selection
- Exercise clearance

Action
- Reasonable weight loss goals
- Behavioral goals
- Dietary goals
- Activity level changes
- Coping skills

Maintenance
- Schedule follow-up appointments
- Monitor progress
- Positive feedback about improvements
- Problem solving

Adapted from Prochaska, 1993[3]

strategies to encourage change according to individuals' stage of motivational readiness to change.[8]

Decisional Balance

The third component of the Transtheoretical Model of Behavior Change is decisional balance.[4] Decisional balance is the perceived benefits minus the perceived losses of a behavior changes. When deciding whether to change, individuals will identify both the pros and the cons of change. If the pros are greater than the cons, the individual will be motivated to make the behavior change. If the cons are greater, the individual will not be motivated for change. Most behavior involves a combination of the pros and cons; what changes over time is an individual's emphasis on the different pros and cons. The pros of weight management may include feeling more attractive, energetic, or healthier after losing weight. The cons may include perceiving exercise as a drudgery, diet foods as unappetizing, or weight loss as expensive.[10]

Most treatment programs [for obesity] assume the individual is ready for change. This assumption, however, is not always accurate.

Self-Efficacy

The fourth and final component of the model is self-efficacy.[11] Self-efficacy, or behavior specific self-confidence, is an individual's judgment of his/her ability to engage successfully in a behavior.[12] Stage of change and self-efficacy are related in that as individuals gain confidence, they will probably progress on their stage of change. Individuals who are losing weight weekly are likely to feel confident to continue losing weight and therefore will continue to exercise and restrict their intake. Individuals who have experienced numerous diet failures probably will have low self-confidence and, therefore, may not be considering losing weight.

Clinical Applications

Obese patients may not be ready or able to lose weight. Psychiatric co-morbidity may prevent some obese patients from losing weight and should be assessed. (See "Sexual Abuse and Obesity," by Teresa K King, this issue).[13] Other problems may not be ready to change, and practitioners can use the transtheoretical model to guide counseling strategies. For each stage, the clinician can draw upon distinct strategies.[7] (Table 2).

Precontemplation

Pre-contemplators may benefit from discussion about how their obesity affects their health status. One study indicated that simply being told that they were overweight by their physician had a positive effect on patients' future weight loss;[14] presumably, more specific health information will be an even more powerful motivator. Some individuals may not connect their health problems with their obesity, so open discussion may be motivating. These individuals also may have a history of weight cycling and may doubt their ability to lose weight. Therefore, exploration of confidence level may set the framework for confidence building.

Contemplation

Since contemplators are beginning to consider losing weight, a shift from problems associated with obesity to a discussion of the benefits of weight loss may motivate them. Similarly, shifting from what went wrong with past weight loss attempts to what parts of these attempts did succeed may enhance confidence. Providing support for past success also may increase the individual's confidence.

Preparation

These individuals are seriously considering losing weight and probably will benefit most from guidance in selecting the appropriate method/program. Individual factors (medical conditions, obesity level, psychiatric co-morbidity, weight loss history) should be considered when helping patients select treatment options. Consideration of whether the individual is a candidate for surgery, a low-calorie diet, or medications will guide treatment selection. How much weight and how quickly they need to lose weight are also considerations. Many obese individuals have medical conditions and will benefit from medical clearance and recommendations from their physician about how to increase their activity level.[13] Some patients may be treated in the primary care setting; some may benefit from referral to specialty providers.[15,16]

Table 3

Setting Behavioral Goals for Weight Management

Remember, in goal setting, we want to set reasonable, measurable, task oriented goals. With this in mind;

1. What is your dietary goal?
2. What is your activity level goal?
3. What problems do you anticipate in reaching these goals?
4. What are some coping strategies you can use to manage barriers?

Action

These patients are losing weight. Discussion about goal weight and weekly weight loss goals are important. Setting specific behavioral goals is important to achieve these weight loss expectations (Table 3). Adding a balanced breakfast, substituting fruit for junk food as an afternoon snack, or frozen yogurt for ice cream, are examples. The clinician can monitor activity level and provide guidance about weekly activity goals, as well as inquire about coping strategies and the patient's problem solving skills.

Maintenance

Maintainers' motivation will vary, and new, unanticipated problems will arise.[17] Scheduling follow-up visits will help to monitor progress. Providing continued feedback about positive changes can help maintainers focus on the benefits rather than the cons of weight management. Reinforcing success may bolster self-confidence. However, what may be most important for this stage is the adoption, by both the practitioner and patient, of a continuous care model of obesity.[7] Like other chronic health conditions (diabetes or hypertension), patients are not expected to be "cured" but "managed" through ongoing treatment and support.

Conclusions

Obesity is a chronic condition and probably warrants the adoption of a continuous care approach.[7] The physician can assist obese patients by helping to prepare them for weight loss, helping them select an appropriate level of treatment, and then providing ongoing support in maintenance. The transtheoretical model of behavior change offers suggestions of how to assist patients at different phases of their weight management program. Since these suggestions are based mostly on theoretical models and clinical experience, research is needed which examines the effectiveness of the transtheoretical model to treat obesity in the health care setting.

References

1. Clark MM, Marcus BH, Pera V, Niaura RS. Changes in Eating Inventory scores following obesity treatment. *Int J Eat Disord* 1994;15:401-405.
2. Prochaska JO, DiClemente CC, Norcross JC. In search of how people change. *Am Psychol* 1992;47:1102-1114.
3. Prochaska JO. Working in harmony with how people change naturally. *Weight Control Digest* 1993;3:249,252-255.
4. Prochaska JO, Velicer WF, Rossi JS, et al. Stages of change and decisional balance for twelve problem behaviors. *Health Psychol* 1994;13:39-46.
5. Kuczmanrski RJ, Flegal KM, Campbell SM, Johnson CL. Increasing prevalence of overweight among U.S. adults: The National Health and Nutrition Examination Surveys, 1960 to 1991. *JAMA* 1994;272(3):205-11.
6. Prochaska JO DiClemente CC. Stages and process of self-change of smoking: Toward an integrative model of change. *J Consult Clin Psychol* 1983;51:390-395.
7. Clark MM, Pera V, Goldstein MG, et al. Counseling strategies for obese patients. *Am J Prevent Med* 1996;12:266-270.
8. Prochaska JO, Norcross JC, Fowler JL, et al. Attendance and outcome in a work site weight control program: Processes and stages of change as process and predictor variables. *Addict Behav* 1992;17:35-45.
9. Rossi SR. Application of the transtheoretical model of behavior change to dietary fat reduction in a naturalistic environment. Unpublished doctoral dissertation. University of Rhode Island, Kingston, RI, 1992.
10. O'Connell D, Velicer WF. A decisional balance measure and the stages of change model of weight loss. *Int J Addict* 1988;23:729-750.
11. Clark MM, Cargill BR, Medeiros ML, Pera V. Changes in self-efficacy following obesity treatment. *Obes Res* 1996;4:179-181.
12. Clark MM, Abrams DB, Niaura RS, et al. Self-efficacy in weight management. *J Consult Clin Psychol* 1991;59:739-744.
13. Clark MM, Ruggiero L, Pera V, et al. Assessment, classification, and treatment of obesity: Behavioral medicine perspective. In: Stoudemire A, Fogel BS, eds. *Psychiatric Care of the Medical Patient*. New York: Oxford University Press; 1993;903-926.
14. Levy BT, Williamson PS. Patient perceptions and weight loss of obese adult. *J Fam Pract* 1988;27:285-290.
15. Brownell KD, Wadden TA. Etiology and treatment of obesity: Understanding a serious, prevalent, and refractory disorder. J *Consult Clin Psychol* 1992;60:505-517.
16. Clark MM, King TK. Obesity level and attrition: A response. [Letter to the editor]. *Obes Res* 1996;4:487-488.
17. King TK, Clark MM. Changing lifestyles: Relapse prevention for exercise. *Weight Control Digest* 1995;5:448-451.

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Health by Numbers

Rhode Island Department of Health
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Overweight and Weight Control among Rhode Island Adults, 1996

Jana E. Hesser, PhD, and Hyun Kim, PhD

"Overweight and obese adults are at increased risk for morbidity and mortality associated with many acute and chronic medical conditions ..." [1]

Table 1.

Overweight among Rhode Island adults, by age, gender, and race, 1996

Demographic Characteristics	Percent Overweight*
All Respondents	26.4
Males	28.5
by Age	
18-24	15.6
25-34	23.6
35-44	34.3
45-54	35.8
55-64	36.9
65-74	29.6
75+	20.1
Females	24.6
by Age	
18-24	18.0
25-34	17.9
35-44	20.8
45-54	26.6
55-64	31.6
65-74	31.0
75+	34.3
Race/Ethnicity	
White, non-Hispanic	26.3
Black, non-Hispanic	44.3
Hispanic	24.6
Asian/ Pacific Islander	9.8

* Percents are based on weighted numbers.

The prevalence of overweight in all age groups in the United States has increased over the past twenty years. During 1987 - 1993, the age-adjusted prevalence of overweight for adults, based on self-report, increased 0.9% per year.[1] Increases have occurred in all sex and racial/ethnic subgroups. Recent national studies indicate that currently about one-third of adults in the U.S. are overweight.[1]

It has been suggested that inactivity may be more important than overeating as a cause for this trend. "The increased prevalence of obesity appears to parallel a decline in average daily energy expenditure."[2] Current recommendations for weight loss and weight control are to combine mild caloric restriction with regular physical activity. The combination is more effective than either approach alone.[2]

This paper presents data on overweight and weight control efforts of Rhode Island adults, obtained from the 1996 Behavioral Risk Factor Surveillance System (BRFSS).

Methods

The BRFSS is an annual telephone survey of randomly selected residents ages 18 and older who live in households with telephones.[3] It asks respondents questions about demographic characteristics and a variety of health behaviors, including ones about height and weight and weight control. The BRFSS is currently performed in 50 states and 4 territories with funding and methodological standards provided by the Centers for Disease Control and Prevention (CDC).[4]

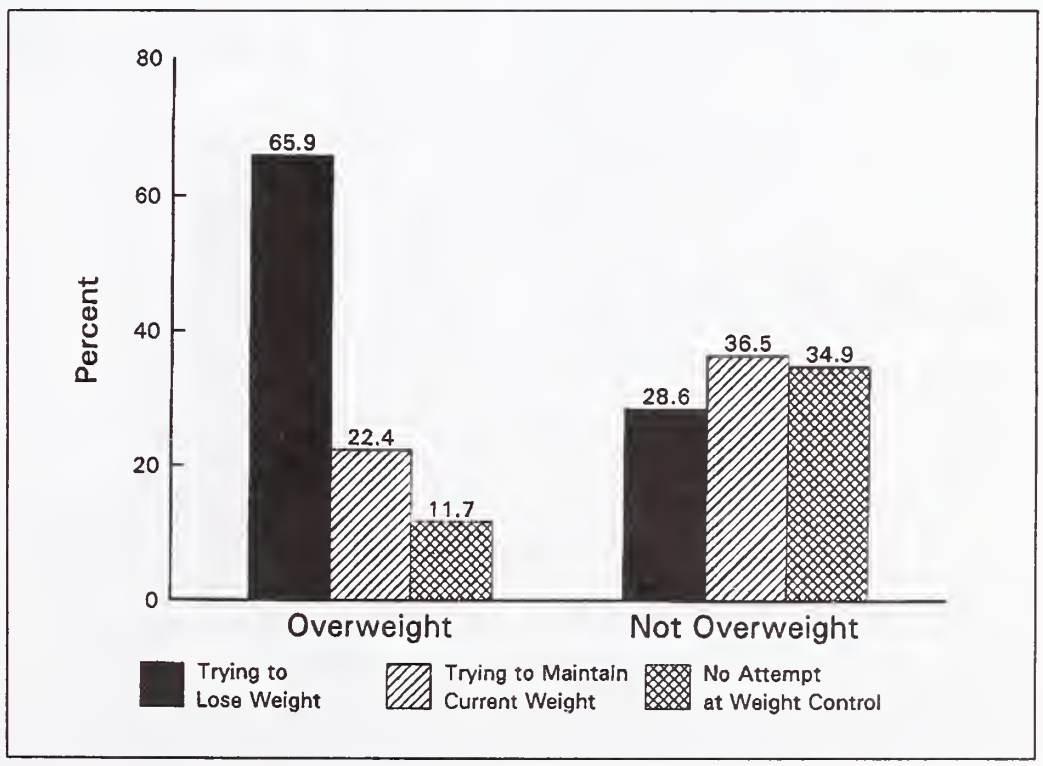

Figure 1: Weight control efforts among Rhode Island adults, by weight status, 1996.

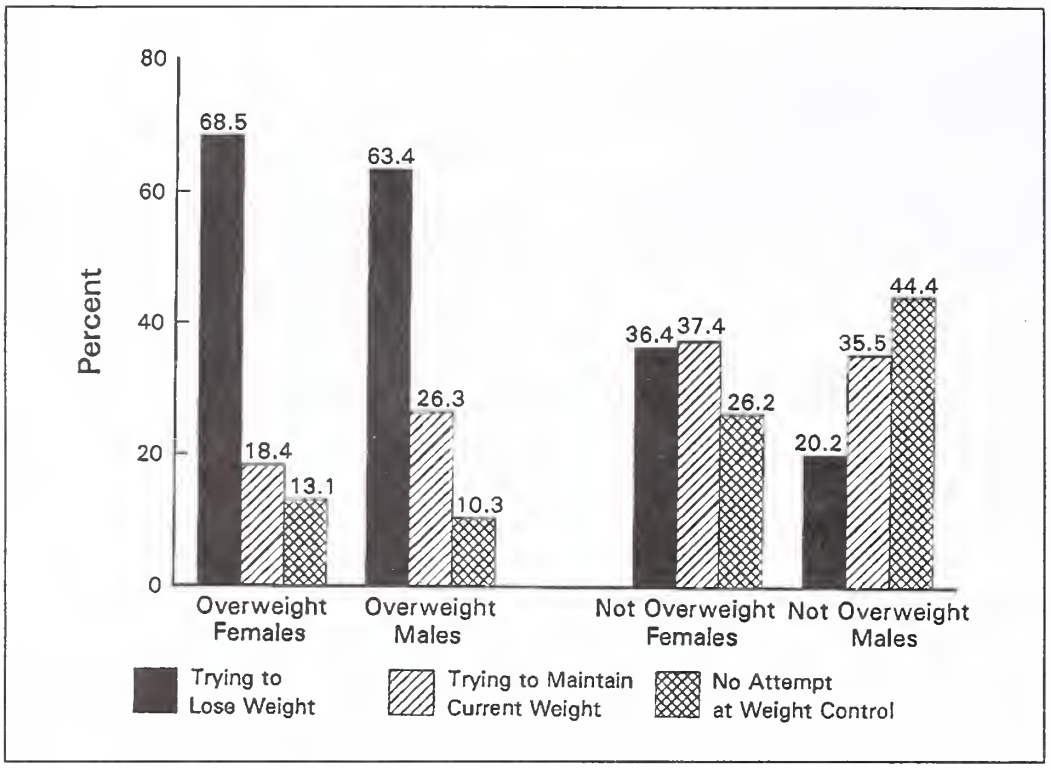

Figure 2: Weight control efforts among Rhode Island adults, by weight status and gender, 1996.

The BRFSS has been conducted in Rhode Island continuously since 1984. Each month a professional survey contractor performs telephone interviews with approximately 150 randomly selected Rhode Island adults, for a total of approximately 1,800 interviews each year. In 1996 additional interviews were conducted to increase the data on Black, Hispanic, and Asian minorities, for a total of 2,482 interviews.

Overweight is determined by calculating Body Mass Index (BMI) based on a respondent's self-reported height and weight (BMI = weight in kilograms, divided by height in meters squared). Males with a BMI equal to or greater than 27.8 kg/m^2 are considered overweight, while females with a BMI equal to or greater than 27.3 kg/m^2 are considered overweight. (These values approximate the 85th percentile of BMI estimated from the 2nd National Health and Nutrition Survey (NHANES II) for persons in the U.S. ages 20-29.)[5]

Respondents were also asked whether they were now trying to lose weight or to keep from gaining weight, and if so, whether they were doing this by changing their diet to include fewer calories or less fat and/or by increasing their practice of physical activity or exercise.

Results

Overweight

Overall, 26.4% of respondents were overweight (Table 1). A higher percentage of males were overweight (28.5%) than females (24.6%). The proportion of overweight increased with age among both males and females, though the patterns of increase varied by gender. Weight increased among males up to age 64, and then decreased, while overweight increased nearly consistently with increasing age among females. Non-Hispanic blacks had the highest percentage of overweight (44.3%) among the four largest race/ethnicity groups, and Asian/Pacific Islanders the lowest (9.8%)

Weight Control

Of all respondents, 39.6% said they were now trying to lose weight and 32.3% said they were trying to maintain their current weight. Overweight persons were much more likely to be trying to lose weight than those not-overweight — 65.9% of overweight respondents said they were trying to lose weight, compared with 28.6% of those categorized as not-overweight (Figure 1). Both overweight females and not-overweight females were more likely to say they were trying to lose weight than their male counterparts; the gender differential was especially large among those who were not overweight. (Figure 2)

The majority (64%) of respondents trying to lose weight are combining diet and exercise to do so, as recommended. However, overweight respondents were more likely than not-overweight respondents to indicate using diet only (35.9% vs. 19.8%) to lose

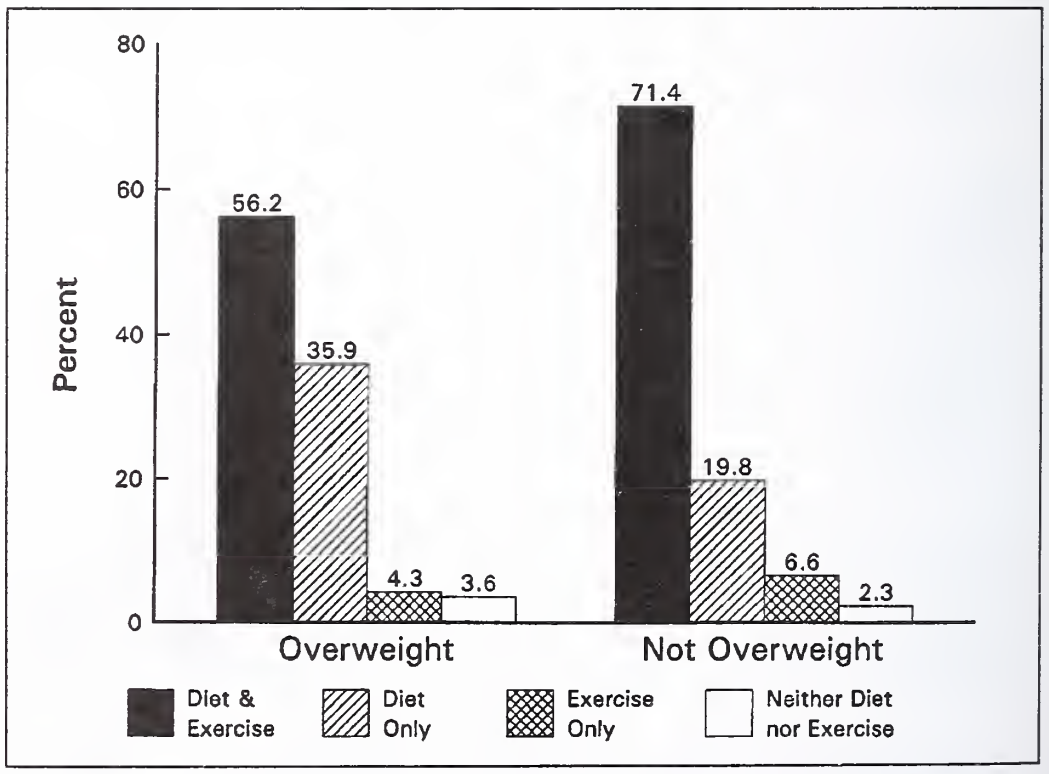

Figure 3: Means used for weight control by Rhode Island adults trying to lose weight, by weight status, 1996.

weight, while not-overweight respondents were more likely than those overweight to use diet and exercise together (71.4% vs 56.2%). (Figure 3) This pattern was much more pronounced among females than among males. These varying approaches to weight loss may be due to age differences between the overweight and the not-overweight groups, or to other restrictions on physical activity experienced by overweight persons.

Results here indicate that information about the importance of adding exercise to diet for weight loss and control is reaching Rhode Islanders. However, the high prevalence of overweight in the population and the high proportion of overweight persons (especially females) using diet alone to lose weight indicate the need to address perceived barriers to physical activity and to continue the promotion of exercise as a vital aspect of weight control.

References

1. Update: Prevalence of Overweight Among Children, Adolescents, and Adults — United States, 1988 - 1994. *MMWR* 1997;46(9):199-202.
2. Reibe, Deborah. Physical Activity Affects Weight Loss and Weight Management. *Medicine & Health Rhode Island* 1997;80(9): 293-295.
3. U.S. Department of Health and Human Services, Public Health Service. *Health Risks in America: Gaining Insight From the Behavioral Risk Factor Surveillance System.* Atlanta, GA: CDC, National Center for Chronic Disease Prevention and Health Promotion, (no date).
4. Frazier EL, Franks AL, Sanderson LM, Behavioral Risk Factor Data. In: *Using Chronic Disease Data: A Handbook for Public Health Practitioners.* Atlanta, GA: CDC, National Center for Chronic Disease Prevention and Health Promotion, 1992.
5. State- and Sex-Specific Prevalence of Selected Characteristics — Behavioral Risk Factor Surveillance System, 1994 and 1995. *MMWR* 1997; 46:(SS-3).

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PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

The Prevention of Osteoporosis: Current Considerations

John P. Fulton, PhD, Deborah Laufer, MA, MSPH, Mary Anne Miller, RN, MPH, and David E. Hamel, MPA

Background

Osteoporosis is an abnormal condition characterized by the demineralization of bone, leading to pain, loss of height, and fractures (commonly of the hip, vertebrae, and forearm). Cases of osteoporosis may be broadly divided into categories and types, based on major risk factors. Primary osteoporosis is associated with *menopause (Type I), or aging* (Type II), or may be idiopathic. Secondary osteoporosis is associated with some medical conditions and the use of some medications (Tables 1 and 2).[1]

Table 1:

Medical conditions associated with secondary osteoporosis

- Malignancy (especially myeloma)
- Hyperthyroidism
- Early oophorectomy
- Hypogonadism in men
- Subtotal gastrectomy
- Hemiplegia
- Systemic mastocytosis

Source: Lindsay R. Osteoporosis: A guide to diagnosis, prevention, and treatment. New York: Raven Press, 1992.

Table 2:

Medications whose use has been associated with secondary osteoporosis

- Glucocorticoids
- Thyroxine
- GnRH analogs
- Anticonvulsants (hypnotics and barbiturates)
- Loop diuretics (furosemide)
- Heparin

Source: Lindsay R. Osteoporosis: A guide to diagnosis, prevention, and treatment. New York: Raven Press, 1992.

Diet and lifestyle factors may also increase the risk of osteoporosis (Table 3).

Table 3:

Diet and lifestyle factors associated with osteoporosis

- High caffeine intake
- High protein intake
- High sodium intake
- High phosphate intake (e.g., phosporic acid, commonly found in cola drinks)
- Low calcium intake (lifelong)
- Sedentary lifestyle
- Alcohol abuse
- Tobacco use

Source: Lindsay R. Osteoporosis: A guide to diagnosis, prevention, and treatment. New York: Raven Press, 1992.

About four out of five people diagnosed with osteoporosis are women, owing to the importance of menopause as a risk factor, and also to the smaller bone mass achieved by women versus men, even at the peak of bone development. In the United States, osteoporosis is also more common among whites, Asian Americans, and native Americans than among blacks.

The prevalence of osteoporosis in Rhode Island in 1996 was estimated to be 43,019, including 34,534 cases among women (80% of all cases) and 8,485 cases among men (20% of all cases). In addition, another 64,843 women and 8,485 men over the age of 50 were estimated to be at high risk of osteoporosis in the future because of low bone mass.[2]

The medical care cost of osteoporotic fractures in the United States is roughly estimated to exceed $13.8 billion, annually, of which Rhode Island's share is estimated to exceed $58 million, annually.

Osteoporotic hip fractures also contribute significantly to mortality and chronic disability. About one-fifth of hip fracture victims die within one year of fracture, and about one-third remain chronically disabled.

Prevention Issues

Bones store and release calcium continuously. In the first three decades of life the rate of storage exceeds the rate of release, allowing bone growth. Around age 30, the bones achieve peak mass, and tend to retain it throughout reproductive life. Thereafter, roughly in parallel with decreasing levels of reproductive hormones, the rate of calcium release exceeds the rate of calcium storage, resulting in demineralization of bone. Although the loss of reproductive hormones is only one factor in the demineralization of bone which occurs with aging, it is a very important one. Because the loss of reproductive hormones occurs, on average, much faster in women than in men, demineralization also occurs, on average, much faster in women than in men, placing women at greater lifetime risk of osteoporotic fracture. The age-appropriate balance of calcium storage and release may be upset at any point in the life cycle by problems with diet and lifestyle, by certain diseases, and by the continued use of certain medications.

Peak bone mass is related to the risk of fracture in later life, because it is directly related to bone strength, thus inversely related to the risk of fracture. The higher the peak bone mass before demineralization begins, the longer a bone retains sufficient strength to avoid fracture. Blacks are at lower risk of osteoporotic fracture than whites, Asians, or native Americans, for example, because on average, blacks achieve higher peak bone mass than other racial groups. (This differential is believed to be an expression of underlying genetic differences.)

Peak bone mass is determined by all factors which affect bone growth, including genetics, nutrition, exercise, disease, medication use, tobacco use, and alcohol abuse.

Achieving Peak Bone Mass

Of the factors affecting peak bone mass, some of them are modifiable, suggesting avenues of prevention which may be profitably pursued in public health interventions. Genetics, of course, is a given, and disease and the use of certain medications may be unavoidable, but good nutrition for bone growth should be achieveable for all individuals in the United States, appropriate exercise for bone growth is easily achieveable for all healthy individuals, and tobacco use and alcohol abuse are avoidable.

As it turns out, all the modifiable factors affecting bone growth are in fact traditional foci of public health efforts. Good nutrition for bone growth is a key goal of prenatal counseling, of health education programs for school children, of nutrition supplement programs such as the WIC program for low income pregnant women, breast-feeding women, and young children, and of government subsidies for milk served to children in schools. Moderate exercise appropriate for bone growth is a key goal of physical education programs for school children, and of health promotion programs for individuals of all ages. This includes children and adults with disabilities that result in mobility limitations, who should have individually designed exercise programs. Similarly, the prevention of tobacco use and of alcohol abuse are important foci of health education programs for school children, and of health promotion programs for individuals of all ages. Therefore, with regard to achieving peak bone mass, the question for public health interventions is not whether to intervene, but where additional efforts may be applied most cost effectively, and where resources to support such efforts may be forthcoming.

Avoiding Net Bone Loss

Counseling Perimenopausal and Postmenopausal Women: Menopause is the most important cause of osteoporosis in the United States, accounting for the large gender differential in osteoporosis prevalence. Net bone loss may be rapid and substantial for the first five to seven years following menopause. Hormone replacement therapy (HRT) is considered the first line preventive treatment for primary, type I osteoporosis. [1] However, because of the potential risks associated with HRT, physicians are urged to counsel women about both its benefits and risks, incorporating pertinent information from the women's family and social histories, and engaging them fully in the decision to receive or not to receive HRT.[3] The U.S. Preventive Services Task Force recommends:

> "Counseling all perimenopausal and postmenopausal women about the potential benefits and risks of hormone prophylaxis is recommended. There is insufficient evidence to recommend for or against hormone therapy for all postmenopausal women. Women should participate fully in the decision-making process, and individual decisions should be based on patient risk factors for disease, clear understanding of the probable benefits and risks of hormone therapy, and personal patient preferences."[3]

Patients who choose not to receive HRT should be thoroughly evaluated for other risk factors of osteoporosis, and counselled about alternative preventive measures, such as calcium and vitamin D supplementation, and the use of alendronate or calcitonin, if indicated.

Identifying Other High Risk Patients: Routine screening for osteoporosis with bone densitometry is discouraged by the U.S. Preventive Services Task Force:

> "There is insufficient evidence to recommend for or against routine screening for osteoporosis with bone densitometry in postmenopausal women. Recommendations against routine screening may be made on other grounds. All postmenopausal women should be counseled about hormone prophylaxis and be advised of the importance of smoking cessation, regular exercise, and adequate calcium intake. For those high-risk women who would consider estrogen only to prevent osteoporosis, screening may be appropriate to assist treatment decisions."[3]

Nonetheless, it is essential that physicians be aware of the risk factors for osteoporosis and consider appropriate diagnostic evaluations of patients at high risk. The National Osteoporosis Foundation recommends bone density testing for individuals in the following high-risk categories:[2]

- Estrogen-deficient women at risk for osteoporosis and who are contemplating treatment.
- Women and men on long-term glucocorticoid therapy.
- Women and men who are hyperparathyroid.
- Women and men who have vertebral abnormalities or radiographic osteopenia.
- Women and men who have been prescribed a treatment for osteoporosis to monitor the response to therapy.

For Additional Information

Suggested Readings

Peel N, Eastell R. Osteoporosis. *BMJ* 1995;310(6985): 989-993.

Liberman UA, Weiss SR, Broll J, et al. Effect of oral alendronate on bone mineral density and the incidence of fractures in postmenopausal osteoporosis. *NEJM* 1995;333(22):1437-1444.

Smith HO, Kammerer-Doak DN, Barbo DM, Sarto GE. Hormone replacement therapy in the menopause: a pro opinion. *Ca* 1996;46(6):343-364.

1 CME Credit Internet Course

Dr. Robert Levin of Boston University Medical School has written an internet course on the prevention, diagnosis, and treatment of osteoporosis. Access to the course is free, but $4.00 is assessed if the user wishes to obtain a certificate for one CME credit upon successfully completing an online test. The internet address is: http://med/www.bu.edu/cme/online.html

References

1. Lindsay R. Osteoporosis: A guide to diagnosis, prevention, and treatment. New York: Raven Press, 1992.
2. National Osteoporosis Foundation. *1996 and 2015 osteoporosis prevalence figures. State-by-state report.* Washington, D.C.: National Osteoporosis Foundation, January, 1997,
3. U.S. Preventive Services Task Force. *Guide to clinical preventive services, 2nd ed.* Baltimore: Williams and Wilkins, 1996.

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Vital Statistics

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health
Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	May 1997	12 Months Ending with May 1997	
	Number	Number	Rates
Live Births	1,170	13,404	13.5*
Deaths	830	9,987	10.1*
Infant Deaths	(8)	(89)	6.6#
Neonatal deaths	(7)	(72)	5.4#
Marriages	833	8,292	8.4*
Divorces	251	3,117	3.1*
Induced Terminations	512	5,739	428.2#
Spontaneous Fetal Deaths	65	989	73.8#
Under 20 weeks gestation	(60)	(903)	67.4#
20+ weeks gestation	(5)	(86)	6.4#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	November 1996	12 Months Ending with November 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	298	3,276	330.8	4,328.5
Malignant Neoplasms	234	2,570	259.5	7,316.0
Cerebrovascular Diseases	50	584	59.0	834.0
Injuries (Accident/Suicide/Homicide)	31	327	33.0	5,800.00**
COPD	44	391	39.5	220.0

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Judicial Diagnosis

Rhode Island's New Physician Profiles

Michele B. Lederberg, JD, MPH

On July 8, 1997, a new law became effective, without Governor Almond's signature, that enhances the public's access to information about individual physicians. Public Law 97-348 directs the Board of Medical Licensure and Discipline to make available to the public, upon request, a profile of each physician licensed to practice in Rhode Island. The Board will compile profiles to fit within a standard form designed by the Board. Anybody can obtain a physician profile by submitting a request to the Board. The Board will charge 50¢ per page or $3.00 per profile, whichever is less, for each profile.

The stated purpose of the law is "to make available information [to the public] which may be helpful in the evaluation and selection of physicians licensed to practice medicine in the State of Rhode Island." Although the law is intended to help the public select their physicians, the law clearly states that the physician profile should not be the sole basis for a person's selection of a physician. Indeed, each profile released to the public must contain the following statement: "This profile contains certain information which may be used as a starting point in evaluating a physician. This profile should not, however, be your sole basis for selecting a physician."

A physician profile will include both basic biographical information and specific information concerning adverse actions against a physician. The biographical information, which physicians will self-report to the Board, must include: (i) specialty board certification; (ii) number of years in practice; (iii) names of the hospitals where the physician has privileges; (iv) the location of the physician's primary practice; and (v) the identification of any language translating services available at the physician's primary office location (this information will be accompanied by a statement indicating that such services may be temporary and a person should call a physician's office to confirm the translating services). Additionally, a physician may have the following information included in his/her profile: (i) appointments to medical school faculties and whether the physician has had responsibility for graduate medical education within the past ten years; (ii) citations of publications in peer-reviewed medical literature within the past ten years; and (iii) elaboration of professional or community service activities and awards.

. . . unless the General Assembly passes a supplemental appropriations bill in January that provides the Department of Health with money to implement the new law, it is unclear when physician profiles will become available to the public.

The details on actions taken or judgments against a physician will be compiled by the Board from information in its possession. This portion of a profile will include: (i) the name of each medical school attended by the physician and dates of graduation; (ii) a list of graduate medical education; (iii) a description of any final Board disciplinary actions within the past ten years; (iv) a description of any criminal conviction for a felony within the past ten years; (v) a description of any revocation or restriction of a physician's hospital privileges, based upon reasons related to professional competence, that was taken by a hospital's governing body or any other hospital official after the physician was afforded procedural due process, or the resignation from or nonrenewal of medical staff membership, all within the past ten years; and (vi) all medical malpractice court judgments, all medical malpractice arbitration awards, and all medical malpractice claims in which a payment is made to a complaining party.

The malpractice information will include a comparison of the individual physician's medical malpractice judgments, awards and settlements against the experience of other Rhode Island physicians who perform procedures and treat patients with a similar degree of risk. In addition, the profile will contain a statement that physicians in some specialities are more likely to be the subject of litigation than others and that settlements occur for a variety of reasons which do not necessarily reflect negatively on the competence or conduct of a physician. The malpractice information in the profile will not include pending malpractice claims or

the actual amount paid by or on behalf of a physician in connection with a malpractice judgment, award or settlement.

Before a physician's profile becomes available for review by the public and before the release of any subsequent modification of the profile that is based upon information not supplied to the Board by the physician or not generated by the Board itself, the Board will give a physician the opportunity to review his/her profile for inaccuracies. The physician will have at least twenty-one days for the review. If a physician disputes information in the profile, the profile will be released without the disputed information - but with a statement that the information omitted in a particular section is the subject of dispute and therefore not available.

Although the law sets September 1, 1998, for public access to the profiles, this deadline may pass. Apparently, when the General Assembly passed this law, the Assembly did not provide additional funding for the Board to create and make available the physician profiles. Therefore, unless the General Assembly passes a supplemental appropriations bill in January that provides the Department of Health with money to implement the new law, it is unclear when physician profiles will become available to the public.

This new Rhode Island law is modeled after one implemented in Massachusetts last year. The Massachusetts law was the first of its kind in the nation. As a result of the Massachusetts law, physician profiles are now available to the public (i) directly from the Board of Registration in Medicine when requested in writing, by telephone, fax or in person, (ii) on a CD-ROM which can be purchased, or (iii) on the Internet. If the response in Massachusetts to the physician profiles is an indication of what will occur in Rhode Island, the Board will be very busy issuing profiles. According to some sources, shortly after the profiles became available, the Massachusetts Board of Registration in Medicine was faxing or mailing close to 1,000 profiles per day. The profiles have become so popular in Massachusetts that the recent budget approved by the Massachusetts Legislature for the Board of Registration in Medicine mandated a specific amount for the physician profile system. By mandating a set amount for the system, the Legislature ensured that any reduction in funding for the Board of Registration in Medicine would not harm the physician profiling system.

As a result of the new law, the public will now have a convenient way to access information on physicians licensed to practice medicine in Rhode Island. The utility of this information, however, is not clear. For example, although a profile will provide basic information, a profile does not indicate whether someone is a "good" doctor. The profiles provide no information on patients' satisfaction with their care from a specific physician, or the health outcomes of a specific physician's patients. Unfortunately, because many people feel intimidated by physicians and because the profiles will be an easy and anonymous way to obtain information, individuals may use them as a substitute for talking to a physician and asking about the things they should really know before selecting a physician. Until the physician profile system is operational in Rhode Island, the value of the profiles will remain unknown.

Michele B. Lederberg, JD, MPH, an associate at Partridge, Snow & Hahn, is a member of its Health Law Practice Group.

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Philately in Medicine

John Tierney

Two Women Honored

Elizabeth Blackwell[1,2] (1821-1910) [U.S., 1970-74, #1399] was the third child of Elizabeth and Samuel Blackwell, a sugar manufacturer in Bristol, England. In 1832, when Elizabeth was 11 years old, her family emigrated to the United States. They settled first in New York City and later moved to Cincinnati. When her father died, Elizabeth was responsible for supporting the family. She taught school for several years. When she was free to do so, she decided to become a physician.

She applied to 17 medical schools; all rejected her, because she was a female. In 1847, Hobart College in New York permitted her to enroll. On January 23, 1849 she graduated with honors, becoming the first female physician in the United States, at the age of 28.

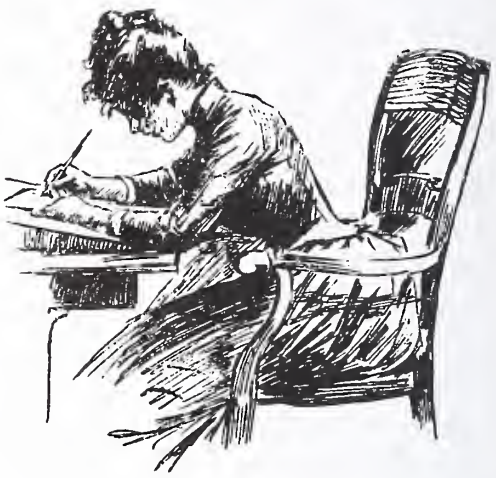
Upon graduation, Elizabeth traveled to Europe, where she received clinical training in Paris and London. Returning to New York in 1851, she established a sanitorium for females and children. In 1860, Blackwell returned to England and dedicated herself to founding the first medical school for women in England in 1875. She became a professor at the school, establishing a program for preventive medicine and hygiene.

On May 3, 1990, Dr. Blackwell died at Hastings in England, at age 89.

Mary Edwards Walker[1,2] (1832-1919) {U.S., 1982, #2013] was born in Oswego, New York. She attended Syracuse Medical School, graduating in 1852 with a Doctorate in Medicine. She practiced medicine in Rome, New York, and supported women' s enfranchisement.

During the Civil War, she was appointed a military physician of the Army, and assigned to the Chattanooga Hospital.

On November 11, 1865, President Andrew Johnson signed an order to award Walker the Medal of Honor for her contributions as a physician in the Civil War - an order cancelled in 1916 when a new regulation decreed that the Medal should only be awarded for brave acts in actual battle. Walker refused to return the medal. Walker died in 1919, still in possession of the medal.



On June 10, 1977, the United States Army announced her award was valid. In 1982 the United States Postal System issued a stamp, portraying Walker and the Medal with the words, "Medal of Honor" and "Army Surgeon."

References

1. Furukawa A. *Medical History Through Postage Stamps.* Ishiyaku Euro America, Inc., 1994.
2. Thomas RL. *Linn's Who's Who on Stamps.* Linn's Stamp News, Sidney, Ohio, 1991.

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Ninety Years Ago

[November, 1907]

The lead article consists of a lengthy, sensitively written description of Dr Greenfell's life and labors in remote Labrador. The paper is the work of Edmund B. Delabarre, a Professor at Brown University.

Laborador is described as an uninviting land bereft of natural resources, where the resident population is despairingly poor, ill-clad, ill-housed, ill-nourished, and unwashed. The land was wholly unfit for agriculture and a meager living was gotten solely through fishing and a little logging. A London-based organization, the Laborador Medical Mission, interested a young, deeply religious medical student named Wilfred T. Grenfell. Upon completion of his formal medical training, followed by some medical practice amongst the fishermen of the North Sea, Grenfell volunteered to go to Labrador as a missionary-physician in 1893. His many skills including great seamanship were of inestimable help to him since his many patients were scattered along an inhospitable coast of almost a thousand miles. Grenfell personally sailed these rugged shores tirelessly practicing medicine, and occasionally preaching, for the remainder of his life in these many poor villages of Laborador. In addition to his medical skills, he also helped to establish hospitals, cooperative stores, schools and even a few small cottage industries to elevate the economic level of those living in Laborador. In winters, when sea travel was inadvisable, he resorted to dog-sled, going as far as 600 miles to set a broken leg. His sermons, people remember, were simple, non-sectarian and deeply human. His aim was to encourage a combination of spiritual and physical health which he achieved, to some measure, by the unceasing exploitation of whatever resources were available to him.

Fifty Years Ago

[November, 1947]

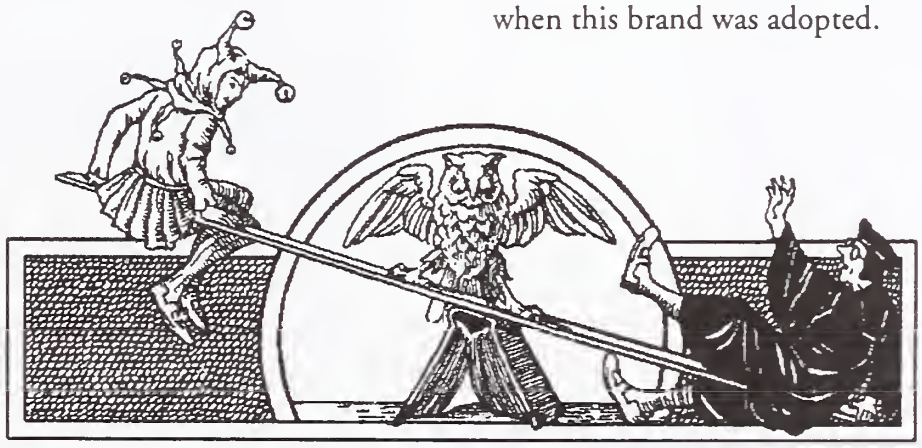
An article by Leo Loewe, MD, describes the more than 450 patients he has treated for various forms of thromboembolic disease with heparin/Pitkin Menstruum. This treatment, particularly for venous thromboembolic disease, was attended with lessened morbidity, prompt and rapid clinical improvement, and little or no residual edema. Five treatment failures are carefully analyzed. The author also details early studies on the use of heparin as a prophylactic agent in the ongoing treatment of arterial thrombotic disease including coronary artery disease.

Cortez F. Enloe, Jr, MD, discusses the nature, the extent and the significance of the war crimes undertaken by German physicians and scientists during World War II. In the words of the author: "Here was cruelty without moral restraint, scientific endeavor without the limitation of ethics. Here were German physicians demonstrating Nazi doctrine at its worst. Here is what happens when the desire for scientific achievement runs amuck and is without regard for the dignity of man."

Bencel L. Schiff, MD, describes the case of a six year old boy with extensive molluscum contagiosum successfully treated with sulfadiazine.

An editorial [and an accompanying summary of proposals] describes the efforts of the Providence Medical Aocciation to improve sanitary conditions in the restaurants of the community. The proposal details the many cases of botulism, dysentery and other clinical manifestations of insanitary food preparation.

A full page advertisement sponsored by Philip Morris suggests to physicians that advising patients not to smoke is difficult. Instead, the ad suggests, they should switch to Philip Morris since most cases of smoker's cough clear up when this brand was adopted.



Twenty Five Years Ago

[November, 1972]

The use and abuse of antibiotic combinations are de scribed by Robert C. Moellering, Jr, MD. The author details the antibacterial effects of antibiotic combinations as forms of synergism, antagonism or indifference. He states that the indications for the use of multiple antibiotics include: known antibiotic synergism against resistant organisms; prevention of the emergence of resistant organisms; mixed infections; and initial therapy of serious infections before the etiological agent has been identified. The disadvantages include: increased number of adverse drug reactions; antibiotic antagonisms; a false sense of security; and unnecessary expense.

The Rev. Joseph L. Lennon, of Providence College, discusses crises in education. After talking about such factors as undisciplined television, the balance between freedom and discipline, and the need for the teacher's authority not to be eroded, he concludes: "Our students need now more than ever a sense of personal commitment. If we do not have it ourselves, how can we ever expect to communicate it in terms of value to our students ? All of us need to commit ourselves to the values that make our lives significant."

A transnasal fiberoptic bronchoscope is described by Joseph F. Smiddy, MD. With this instrument bronchoscopy can be undertaken easily with local anesthesia and provides excellent visualization, along with biopsy capability, of all segmental and subsegmental orifices.

A brief historic note describes the life of Dr. d'Antonmarchi, the Corsican physician who was Napoleon's personal doctor on St. Helena.

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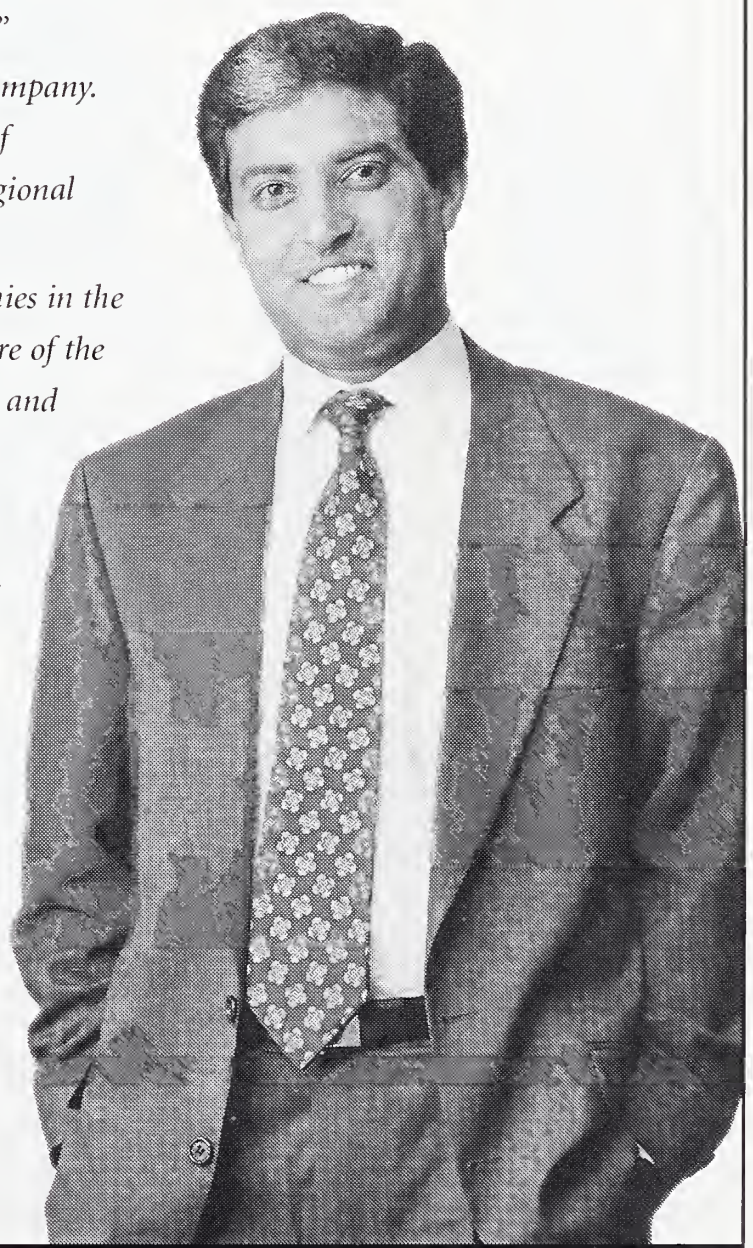

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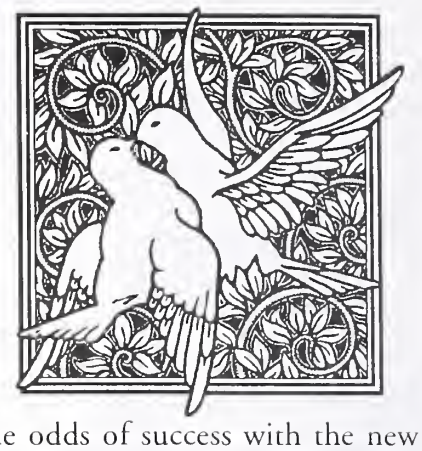

A Formulation of the Problem

KS is a 37 year-old GO PO female who presented to the office at Women and Infants' Hospital, Division of Reproductive Endocrinology, for treatment of infertility in June 1997. She and her husband, JS, have been married for seven years and have attempted to conceive for the last four years.

Basal body temperature charts - biphasic for six months (1994)

Urine luteinizing hormone testing - LH surge seen

Hysterosalpingogram - normal uterus and patent tubes (1995)

Post-coital test - done in three different cycles - always borderline with few motile sperm

Endometrial biopsies - first cycle checked in 1995 - out of phase; rechecked - in phase

Semen analysis - 3.5cc, 32 x 10^6sperm/cc, 55% motile, 46% normal morphology by standard criteria

She has been unsuccessfully treated with six cycles of clomiphene citrate with intrauterine inseminations.

KS had a diagnostic laparoscopy in 1996 which showed normal tubes and ovaries but stage I endometriosis. The remainder of her history and physical examination is unremarkable. Her husband has never fathered any pregnancies. They are wondering if they are candidates for Assisted Reproductive Technology (ART) treatment.

This fictional couple is typical of the patient we see presenting for consideration of the assisted reproductive technologies and advanced infertility treatments. The woman is often more than 35 years old with a long history of infertility. Many times, no significant etiology for the infertility has been identified. (KS may have a mild cervical factor, possibly an intermittent luteal phase defect, and has minimal endometriosis). None of these factors are overwhelming, yet the couple still hasn't conceived. Coming into our office, the infertile couple is unsure of the odds of success with the new technologies and concerned about the financial impact, emotional effects, and time involvement. Their marriage is strong, but despite counseling and support groups, is stressed by the longstanding infertility.

Prior to 1978, with the birth of the world's first in vitro fertilization baby, there were few options for this type of couple. It was impossible to determine whether they might have a fertilization problem, and there was a limited ability both to identify the real cause of their infertility and to treat it. With the knowledge and experience gained from ART, we are closer to understanding some of the mysteries of human reproduction - but we still have much to learn.

In this issue, we hope to update you on the science of human fertilization, the status of the Assisted Reproductive Technologies, issues related to infertility and aging, ethical dilemmas in this area, the evaluation of the male in an infertile couple, laboratory requirements and new treatments for male factor infertility. I know you will find this information both fascinating and informative as we share some of the latest developments in our knowledge of the process of reproduction.

– Carol Wheeler, MD

Carol A. Wheeler, MD, is Assistant Professor, Division of Reproductive Endocrinology, Department of Obstetrics/Gynecology, Brown University School of Medicine.

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Seasons Greetings

In this season of holidays, the Publications Committee, the Editorial Board and the editors join in wishing each of our readers a safe, happy and serene celebration. May the new year bring you good health, good learning, professional fulfillment and joy.

Ramazzini and Diseases of the Workplace

The conventional transaction between patient and physician, at first glance, seems to run something like this: A human being perceives a disability or malfunction within himself. He seeks the help of a physician who confronts this new patient as one who might be suffering from any one of a vast number of disorders. The physician then proceeds to evaluate the perceived dysfunction, make a diagnosis, and perhaps initiate some remedy. Ideally, the diagnosis is correct, the intervention effective, and the patient then resumes his active role in the affairs of the community.

The realities, however, are otherwise. Were each new patient suspected of, and tested for, an infinite number of possible maladies, immense resources and time would then be needlessly expended. Instead, the skilled practitioner rapidly narrows the spectrum of potential diagnoses by first knowing the gender, age, life style and occupation of the patient. The concept that occupation, per se, constitutes an important, even critical, determinant of a person's physical vulnerabilities is the legacy of a remarkable 18th century Italian physician named Bernardino Ramazzini.

Ramazzini was born in the north Italian village of Carpi in 1633. He received his medical education at Parma and served on the medical faculty of the University of Modena for a few decades before accepting an invitation from the Venetian Senate to fill the post of Professor of Medicine at Padua. He remained at Padua for the remainder of his active life, dying suddenly while lecturing to medical students in his 81st year.

Ramazzini was a shy man, singularly untravelled and only modestly educated. He was unschooled in the scientific revolution initiated by Harvey, Boyle, Newton and the early microscopists. His unique skills - and his monumental contributions - required not much more than a tireless diligence to details, the employment of his native intelligence and a fierce commitment to the ethical role of medicine in society.

Historians say that his interest in occupational medicine began when he was writing a commentary on illnesses arising in privy cleaners. He wrote: "Medicine should make a contribution to the well-being of workers. So I have not thought it unbecoming to make my way into the lowest workshops and study the mysteries of the mechanical arts." Indeed, for many decades, this inquisitive professor of medicine descended into countless places of labor to document the misery accompanying many vocations and identify the ailments associated with each.

In a masterful book summarizing his findings, *De Morbus Artificum* [Diseases of Workers], 56 separate professions, both manual and sedentary, were scrutinized in terms of the nature of the labor and its kinetics, the work environment and the diseases common to them. He also offered certain simple and feasible recommendations. The professions analyzed included such disparate occupations as miners for metal ores, apothecaries, cheese makers, stone cutters, farmers, midwives, well-diggers, as well as those engaged in non-physical work such as scribes and cloistered nuns. His recommendations included the need for protective clothing, steps to counteract dehydration in

forge workers, the correction of faulty posture through ergonomic design, and bathing facilities for those repeatedly immersed in toxic substances such as lead or mercury-contaminated dust. His book was published in 1700 and established, years before the industrial revolution, the clinical subspecialty of occupational and environmental medicine. His impact was so great and so enduring that the Italian Journal of Social Medicine, to this day, is called *Il Ramazzini.*

Ramazzini became so familiar with the elements of each of these laboring vocations that he could identify a worker's trade merely by examining the distinguishing stigmata on his hands.

In his chapter on diseases of potters, he noted that those workers using glazes colored with lead salts were prone to the development of fine tremors; and if they continued at their job, ultimately paralysis. He enumerated the effects of mercury fumes on those mining cinnabar ore. And he described in great detail the palsies and asthmatic breathing common in the laborers producing the famous Venetian mirrors on the island of Murano. He summarized the clinical course of the Tuscany goldsmiths who became cachectic by age 30 and who died before their 40th birthday ascribing their disease to the pervasive mercury fumes from the gold-mercury amalgam. He docu-

mented the chronic lung disease in workers exposed to grain dust on the threshing floors or in grain storage depots.

One of his most detailed studies concerned workers in the stone cutting trades. Ramazzini was one of the first to claim that mineral dusts will cause irreversible lung disease, something that today is called silicosis. And while autopsy examination at that time was exceedingly rare, he nonetheless was able to examine the lungs of some of these expired stone-cutters, demonstrating the accumulated stone dust in the impaired and scarred lung tissue.

The core of medicine is properly dedicated to the concept that caring for single patients, one at a time, is the highest calling of the profession. But there is yet another facet of medicine which regards the community as the patient. And, accordingly, these community-oriented physicians ask what local dangers lurk, what hazards might befall an individual in this occupation or that environment? These two components of medicine, while distinguishable, are nonetheless mutually supportive. The public health physicians, including those concerned with occupational epidemiology, identify the hazards while the practitioners translate such causal relationships into specific therapies for the individual patient.

But somebody had to teach physicians that a patient's surroundings and livelihood must be examined as diligently as his heart and lungs. And it was Ramazzini who declared the following to his medical students: "To the questions recommended by Hippocrates, one more should be added: What is your occupation ?"

– Stanley M. Aronson, MD

In Memoriam

We have lost a great scholar and a dedicated physician. On November 5, 1997, in the ninetieth year of his life, Seebert J. Goldowsky, MD, died.

Seebert Goldowsky was born in Providence in the summer of 1907. A graduate of Classical High School and Brown University, he received his MD degree from Harvard in 1932. He trained in surgery at Beth Israel Hospital, Boston, Boston City Hospital, Charles V. Chapin Hospital, Providence, and Mt. Sinai Hospital, New York, after which he embarked upon a career in general surgery in Providence.

From 1942 to 1945 he served with distinction as an army surgeon in a succession of island invasions in the southwest Pacific theater of operations. In 1945 he resumed his private practice in Providence, with hospital appointments at Rhode Island Hospital, Roger Williams General Hospital, and the Miriam Hospital, where he had been chief of surgery.

Beginning in 1962, and for 27 uninterrupted years, Seebert Soldowsky edited this journal, thus contributing materially to the professional competency of a generation of Rhode Island's physicians. He also served on countless agencies, commissions, boards, and professional societies, giving freely of his talent and experience. He was honored repeatedly by local and national societies, as well as by Brown University.

Through his teachings, his many editorials, his sage counsel and his enduring books, Seebert Goldowsky educated all of us. In the words of the Psalmist, he walked in the way of good men and kept to the paths of righteousness.

– Edward Feller, MD
– Joan Retsinas, PhD
– Stanley M. Aronson, MD

Human Fertilization

John Pepperell, PhD

Fertilization occurs when male and female haploid gametes fuse, causing a mix of genetic material with the formation of a diploid cell that subsequently undergoes mitotic division and differentiation. Successful fertilization is dependent on the appropriate development and maturation of the haploid gametes.

Overview of Oocyte Development

Primordial germ cells of the embryonic ovary are derived from cells of the hindgut region. During embryonic development the primordial germ cells, or oogonia, undergo mitotic replication until around the time of birth when they enter meiotic division with arrest at the diplotene stage of prophase I. The genetic material is now enclosed within the germinal vesicle and is maintained at this stage of meiosis until ovulation and fertilization which results in the completion of oocyte meiosis. At birth the human ovary contains approximately 2 million oocytes, but at the onset of puberty only approximately 400,000 will be available for potential ovulation. During reproductive life, approximately 400 oocytes will undergo ovulation, and by the time of menopause, only 1000 oocytes will remain. Throughout this period, the reduction in numbers of oocytes occurs by atresia of follicles.[1] The mechanisms by which follicles are selected for full development or atresia are not fully understood, although atresia is known to involve apoptosis.

Apoptosis

Apoptosis is a regulated and controlled mechanism of cell death that underlies follicular atresia. The gonadotrophin follicle stimulating hormone (FSH) effectively rescues a population of follicles from atresia. Studies in the rat and other species have shown products of the Bcl-2 gene family to be important in ovarian apoptosis, since FSH regulation of Bcl-2 and Bcl-x_{long} expression in granulosa cells supports follicle development and protects against apoptosis. In contrast, Bax and Bcl-x_{short} expression induce apoptosis. Other gene products also regulate apoptosis. For example, activation of Fas by binding with Fas ligand can induce apoptosis in different cell types. Fas is expressed by human oocytes, but in the rat, Fas is expressed in granulosa cells, while Fas ligand is localized to oocytes. Co-localization of Fas and Fas-ligand correlates with apoptotic granulosa cells,[2] indicating possible cross-talk between somatic and germ cells in the regulation of follicular development.

Expression of the apoptotic gene regulators in the ovary may be controlled by a number of factors in addition to FSH. Recent studies indicate paracrine control in the ovary since tumor necrosis factor alpha (TNF-a) and interferon gamma (IFN-g) stimulate apoptosis, while insulin- like growth factor 1 (IGF-1), basic fibroblast growth factor (b-FGF) and transforming growth factor alpha (TGF-a) suppress apoptosis.

Abbreviations Used:

b-FGF	basic fibroblast growth factor
cAMP	cyclic adenosine monophosphate
cdk2	cyclin-dependent kinase 2
FSH	follicle stimulating hormone
GABA	gamma amino butyric acid
IFN-g	interferon gamma
IGF-1	insulin-like growth factor 1
KL	kit ligand
LH	luteinizing hormone
MPF	maturation promoting factor
TGF-a	transforming growth factor alpha
TNF-a	tumor necrosis factor alpha
ZP1	zona pellucida glycoprotein 1

Oocyte Growth and Selection

Although there is a reduction in number of oocytes from birth through to menopause, some follicles are selected for development. During the luteal phase of the human menstrual cycle, both ovaries contain a total of 20 small antral follicles that undergo growth and development, but only one follicle will go on to ovulate, while the residual members of the cohort undergo atresia.[3] At this stage, follicle development is driven by follicle stimulating hormone (FSH), but it is unclear why relatively few follicles of the ovary will respond and join a cohort. The inclusion of follicles in a cohort may be related to the chronological production of primordial germ cells.

Newly identified factors that appear important in embryonic follicle growth, as well as in adult follicle growth and potential selection, are the gene products Kit, and Kit Ligand (KL).[4] These factors are produced by granulosa cells and oocytes and further indicate that cross-talk between follicle cells and the oocyte is required for normal follicular development.

Meiotic Competence of the Oocyte

At birth the production of female haploid germ cells is halted at the diplotene or dictyate stage of prophase 1, and this arrest is maintained until just prior to ovulation. Between meiotic arrest and ovulation, the oocyte is under complex control that incorporates the selection of a follicle to undergo development (rather than atresia) and resumption of meiosis.

During oogenesis, as the non-growing oocytes enter the growth phase, the zona pellucida is formed by the oocyte. The zona pellucida is formed of proteins and polysaccharides

that form a mesh-like protective coating around the oocyte. Three of the glycoproteins, ZP1, ZP2 and ZP3, have been extensively studied and are involved in sperm-egg recognition (see below). Adjacent to the zona pellucida are several layers of granulosa cells, known as cumulus cells. The most proximal layer to the oocyte is termed the cumulus radiata. All granulosa cells are connected by homologous gap junctions, while heterologous gap junctions connect the cumulus radiata through the zona to the oocyte. Therefore, a continuous syncytium exists between granulosa cells and the oocyte, and it is via these gap junctions that the oocyte and granulosa cells may communicate and exchange nutrients and growth factors. Indeed, gap junctions are essential for oocyte growth and the ability to aquire meiotic competence. Cyclic adenosine monophosphate (cAMP) produced by granulosa cells as a second messenger can pass to the oocyte via the gap junctions and activate protein kinase A. In the mouse and rat, removal of cumulus cells from fully grown oocytes of antral follicles stimulates resumption of meiosis to metaphase II, when meiosis is once again arrested. However, the effect of removal of cumulus cells can be blocked if denuded oocytes are incubated in the presence of cell permeant analogs of cAMP, such as dibutyryl cAMP, indicating the importance of intra-oocyte levels of cAMP for maintenance of meiotic arrest after prophase I. Indeed, a decline in oocyte levels of cAMP occur in mice and rats as meiosis continues from prophase I.[1] The purines hypoxanthine, guanosine and adenosine may also be involved in maintaining meiotic arrest, although part of their effects may be mediated through cAMP. In addition, Kit and KL are important regulators of follicle growth that are also involved in meiotic arrest and oocyte growth.

At present, it is unclear what the intracellular signal for resumption of meiosis may be. However, an oocyte becomes capable of resuming meiosis after a certain diameter and growth period have been attained. This occurs in the early antral stage when the follicle becomes regulated by gonadotrophins, at which point oocyte nucleolar transcription ends and synthesis of maturation proteins begins.[5] *In vivo*, the luteinizing hormone (LH) surge resumes the meiotic process by stimulating completion of the diplotene stage and permits rapid progression through diakinesis, metaphase, anaphase, and telophase of the first meiotic division until metaphase of the second meiotic division when the process is once more halted. Morphologically, this process is characterized by the breakdown of the germinal vesicle (i.e., the nuclear envelope of the immature oocyte), chromosomal condensation, and extrusion of the first polar body after metaphase I. *In vitro*, gonadotrophin stimulates resumption of meiosis in oocytes of developed antral follicles, even in the presence of dibutyryl cAMP or agents that increase intracellular levels of cAMP. Thus, a positive signal induced by gonadotrophin overcomes the inhibitory effects of protein kinase A on meiosis.

At birth the human ovary contains approximately two million oocytes, but at the onset of puberty only approximately 400,000 will be available. During reproductive life about 400 oocytes will undergo ovulation ...

Maturation Promoting Factor

Early studies with frog oocytes identified a maturation-promoting factor (MPF) in cytoplasm that robustly maintained meiotic arrest of mature oocytes. Subsequently, MPF was found to consist of two fractions, a catalytic subunit, cyclin-dependent kinase 1(cdk1, also known as $p34^{cdc2}$), and a regulatory subunit, cyclin B. MPF is a serine/threonine kinase that when activated induces chromosomal condensation, nuclear envelope breakdown and cytoplasmic reorganization with entry into the M-phase of either mitotic or meiotic cell cycles. During meiotic maturation, MPF activity shows a biphasic increase that correlates with metaphase I and metaphase II arrest. Activation of MPF appears to be dependent upon cyclin B_2 synthesis. Fertilization releases metaphase II arrest by inactivation of MPF through cyclin B degradation.

The ovulatory surge of gonadotrophins stimulate the cumulus cells to synthesize hyaluronic acid, which disperses the cumulus cells into a gelatinous layer around the oocyte.

Sperm and Egg Interaction

Mature sperm deposited in the female reproductive tract travel independently of their own motility to the ampulla region of the fallopian tubes where fertilization occurs. However, relatively few sperm reach this position. In the human, it has been estimated that of 6×10^6 sperm cervically inseminated, only 600 reach the oviduct, but those sperm that reach the ampulla (in the low hundreds) are highly efficient for fertilization.[5] For fertilization to occur, sperm must undergo capacitation and the acrosome reaction.

Capacitation

Capacitation is a preparatory phase by which sperm become capable of fertilization. The process of capacitation is poorly understood, but results in hyperactive sperm motility, and is necessary to allow interaction with an oocyte and to undergo the acrosome reaction. Although relatively little is known about the signaling aspects of capacitation, changes in intracellular concentration of certain ions (Ca^{2+}, Na^+ and H^+) and cAMP take place and are associated with altered plasma membrane fluidity, metabolism, and motility.[1] In addition to mediating effects through protein kinase A, cAMP mediates a pathway that involves protein tyrosine phosphorylation; however, in human sperm, tyrosine phosphoryla-

tion is not the sole event that permits completion of capacitation. Contents of the oviduct are likely to initiate capacitation. Although progesterone is known to induce capacitation, recent findings suggest that amino acid neurotransmitters, such as GABA, the main inhibitory neurotransmitter of the brain, may also play a role. GABA is found in the female reproductive tract in high concentrations, and can induce capacitation of a sub-population of sperm through a $GABA_A$ receptor mechanism that effects intracellular ion concentrations.[6]

Acrosome Reaction

The acrosome reaction enables the sperm to bind and fuse with the plasma membrane of the oocyte. At the head of the sperm is a sac-like structure formed from the sperm's outer plasma membrane and an inner acrosomal membrane that overlies the nuclear envelope. During the acrosome reaction, the outer plasma membrane and inner acrosome membrane become fused and dissipate liberating the contents of the acrosome sac, and exposing the inner acrosomal membrane. The contents of the acrosomal sac include enzymes, such as hyaluronidase and other hydrolytic enzymes. It is unlikely that these enzymes digest the viscous mucopolysaccharide hyaluronic acid secreted by the cumulus cells, since the acrosome reaction is only stimulated when the sperm comes into contact with the zona pellucida. The release of acrosomal hyaluronidase is therefore released after passage through the cumulus cell mass, and may be involved in penetration of the zona. However, penetration of the cumulus cell layer may be facilitated by a sperm plasma membrane protein, termed PH-20, that has intrinsic hyaluronidase activity.[7]

Oocyte/Sperm Binding

Primary binding of sperm takes place when acrosome intact sperm bind to the zona pellucida glycoprotein, ZP3. In some species acrosome reacted sperm are also able to bind to the zona (secondary binding), but these sperm bind to a separate glycoprotein, ZP2. Binding of sperm to the zona pellucida results in intracellular calcium mobilization, adenylate cyclase activity and intracellular pH changes in the sperm that mediate the acrosome reaction. Following the acrosome reaction the PH-20 protein migrates to the inner acrosome membrane and is also involved in binding to the zona. *In vitro* studies with antibodies that prevent binding of sperm and oocytes with ZP3 or PH-20 have shown potential contraceptive effects with blocked or reduced fertilization, respectively. The binding of sperm to the zona is highly species specific, although with the zona removed cross-fertilization is possible in some cases. Following binding, the sperm traverse the zona by mechanisms including enzymatic hydrolyzation and mechanical force, driven by the hyperactive motility of the sperm's tail-piece. The sperm then passes through the perivitelline space and its head (the inner acrosome membrane) attaches to microvilli of the oocyte plasma membrane. Following the initial contact of the sperm head with oocyte plasma membrane, the sperm body becomes tangentially orientated and lies alongside the oocyte. Fusion of the sperm and oocyte plasma membranes takes place, except for the membranes of the inner acrosomal membrane which become vacuolated and incorporated into the egg cytoplasm. In the mouse, sperm preferentially bind to an area of the plasma membrane opposite the first polar body, and some studies suggest a similar orientation of sperm and egg in the human.

Oocyte Activation

Oocyte activation occurs when the sperm fuses with the oocyte plasma membrane. This fusion causes a transient wave of elevated intracellular calcium that stimulates resumption of oocyte meiosis by inhibition of MPF activity. With the completion of meiosis II, the oocyte becomes a haploid cell capable of combining with the male germ cell to produce a new diploid cell. In some species, meiotic maturation of metaphase II arrested oocytes can also be induced by agents that increase intracellular calcium, such as calcium ionophore, although in human oocytes another factor, in addition to calcium, may be necessary to resume meiosis. The mechanism of sperm-induced activation is not completely understood, but following the initial calcium transient, a series of episodic calcium waves are set up that are essential for fertilization to occur. These oscillations are driven by a sperm protein, termed oscillin.[8] There is little evidence to suggest that binding of sperm with its oocyte receptor activates G-protein mediated production of inositol trisphosphate (IP3) which is known to release calcium from the endoplasmic reticulum of somatic cells. However, the oocyte does contain IP3-sensitive, as well as ryanodine-sensitive, calcium pools that may be involved in the calcium spike of fertilization.

In addition to resumption of meiosis the increase in intracellular calcium stimulates the cortical reaction in the oocyte. Cortical granules present in the cortex of the ooplasm undergo exocytosis and liberate enzymes into the perivitelline space, where they modify the zona pellucida to block polyspermy. Modifications to the zona include cross-linking of ZP3 by O-linked oligosacharrides and proteolytic action on ZP2, which blocks sperm binding and hardens the zona.

Pronucleus Formation and the Mitotic Spindle

After sperm entry, the oocyte extrudes the second polar body, and begins to incorporate some of the sperm components. Extrusion of the second polar body is dependent on cytoskeleton components that are extremely labile in a non-ideal environment, and therefore necessitates careful monitoring of culture conditions in *in vitro* fertilization.

Cytoplasmic contents of the oocyte are essential for successful incorporation, and if the oocyte has not undergone adequate cytoplasmic maturation, fertilization will fail at this stage. One important cytoplasmic maturation factor is the antioxidant, glutathione. During maturation the oocyte needs to accumulate glutathione which is essential for sperm nucleus

decondensation and promotion of male pronucleus formation[9]. Glutathione likely assures the reduction of disulfide bonds that are prevalent in the sperm nucleus. Decondensation of the sperm head occurs approximately 1 hour after fertilization. Development of the male pronucleus from the sperm DNA also requires maternal histones, nuclear laminins and nucleosporins.[9] The male pronucleus develops before the female pronucleus, and is influenced by various growth factors.[5]

The pronuclei become apposed to each other and are drawn to each other by cytoskeletal elements, known as the sperm aster microtubules, which are organized by the sperm-derived centriole. The centriole is likely to be exposed from its surrounding sperm mid-piece and tail piece by a disulfide-bond reduction process.[9] The formation of the centrosome, with the gathering of centrosomal proteins and sperm aster microtubules around the centriole, is dependent on the male centriole in the human. As the pronuclei move towards each other, they undergo DNA replication, and after approximately 5 hours, syngamy begins as chromosomes condense in prophase of the first mitotic division. Maternal and paternal chromosomes condense separately during this process, and then become mixed at the metaphase plate with the formation of the mitotic spindle. Fertilization is achieved as the chromosomes separate in mitotic anaphase; the chromosomes become completely divided and polarized to the opposing spindle poles by the completion of telophase and the initial mitotic division of daughter cells is completed that signifies the beginning of a new individual. This completes the complex sequence of events that occur in human fertilization. The information gathered over the last 10-20 years has improved our understanding of some of these events; however, substantial gaps in our knowledge remain, and to improve the treatment of infertile couples even further research is necessary in this area of science.

References

1. Eppig JJ. Regulation of Mammalian Oocyte Maturation. In: Adashi EY, Leung PCK, eds. *The Ovary.* New York: Raven Press, 1993;185-208.
2. Hakuno N, Koji T, Yano T, et al. Fas/APO-1/CD95 system as a mediator of granulosa cell apoptosis in ovarian follicle atresia. *Endocrinology* 1996; 137(5):1938-48.
3. Baird DT. The Ovarian Cycle. In: Hillier SG, ed. *Ovarian Endocrinology.* Oxford: Blackwell Scientific Publications, 1991;1-24.
4. Ismail RS, Dube M, Vanderhyden C. Hormonally Regulated Expression and Alternative Splicing of Kit Ligand May Regulate Kit-Induced Inhibition of Meiosis in Rat Oocytes. *Developmental Biology* 1997;184:333-342.
5. Edwards RG, Brody AA. Oocyte Growth, Maturation, and Fertilization. *Principles and Practice of Assisted Human Reproduction.* Philadelphia: W. B. Saunders, 1995;285-349.
6. Meizel S. Amino Acid Neurotransmitter Receptor/Chloride Channels of Mammalian Sperm and the Acrosome Reaction. *Biology of Reproduction* 1997;56:569-574.
7. Myles DG, Primakoff P. Why Did the Sperm Cross the Cumulus? To Get to the Oocyte. Functions of the Sperm Surface Proteins PH-20 and Fertilin in Arriving at and Fusing with the Egg. *Biology of Reproduction* 1997;56: 320-327.
8. Parrington J, Swann K, Shevchenko VI, et al. Calcium oscillations in mammalian eggs triggered by a soluble sperm protein. *Nature* 1996; 379(6563):364-8.
9. Sutovsky P, Schatten G: Depletion of Glutathione during Bovine Oocyte Maturation Reversibly Blocks the Decondensation of the Male Pronucleus and Pronuclear Apposition during Fertilization. *Biology of Reproduction* 1997;56:1503-1512.

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The History of Assisted Reproductive Technology and Its Future

Gary Frishman, MD, and Andrew Blazar, MD

Overview of Infertility in the United States

Though the world is troubled by the threat of overpopulation and the United States by a vast number of unplanned pregnancies, both the reproductive endocrinologist and the practicing obstetrician-gynecologist spend much of their professional time coping with the diagnosis and treatment of infertile couples. The prevalence of clinically significant infertility (relative) or sterility (absolute) has most recently and scientifically been measured by a national survey of a sample of 10,847 women interviewed utilizing a computer-assisted format between January and October 1995 under the auspices of the United States Centers for Disease Control.[1] This study and its predecessors (1988, 1982) found the following conclusions and trends: 6.1 million women (10% of the sample) complained of impaired fecundity (having had difficulty or found it impossible either to become pregnant or carry a baby). Approximately half of these women had no children (2.8 million) while the remainder (3.3 million) experienced impaired fecundity after the birth of at least one child. The number of women actually seeking medical attention with such complaints in the United States in 1995 was estimated at 1.2 million. Finally, 8% of all married childless women are estimated to have sought infertility services within the last year.

An important conclusion from the CDC study is that although the absolute number of infertile individuals has risen and accounts at least in part for the increased demand for medical services, the prevalence of impaired fecundity within each age group has remained essentially unchanged. Rather, the number of women aged 35-44 has increased greatly in the recent past. Deferred childbearing, the wider availability of treatment, and increased public discussion of infertility have also contributed to the demand for such services.

Overview of non-ART treatments and success rates

The diagnosis and treatment of infertility is customarily classified into several categories. Failure to ovulate regularly is responsible alone for 15% of infertility. Therapy usually consists of oral (clomiphene citrate) or parenteral (gonadotropin) treatment, with pregnancy occurring in approximately 75% of such patients. Tubal disease, most often caused by prior inflammatory disease or pelvic surgery, is even more common, accounting for 30% of infertile couples. As treated by various surgical approaches, successful outcomes after this diagnosis are less frequent, occurring in perhaps one third of couples overall. Another group of patients manifest infertility related to endometriosis. At least an additional 30% of infertility are accounted for by abnormal semen quality, often in the past best treated by the use of donor gametes. A small group of couples (perhaps 10%) have infertility associated with failure of satisfactory sperm-cervical mucus interaction, often treated by intrauterine inseminations. After all possibilities are evaluated, a subset of patients remain (10%) who have no identifiable cause of their infertility.

Abbreviations Used:

ART	assisted reproductive technology
ASRM	American Society of Reproductive Medicine
CDC	Centers for Disease Control and Prevention
FISH	fluorescence in-situ hybridization
GIFT	gamete intrafallopian transfer
HIV	human immunodeficiency virus
hMG	human menopausal gonadotropin
ICSI	intracytoplasmic sperm injection
IVF	in vitro fertilization
LH	luteinizing hormone
SART	Society for Assisted Reproductive Technology
TET	tubal embryo transfer
ZIFT	zygote intrafallopian transfer

Overview of current ART success rates

To compare the results achieved by the current use of assisted reproductive technology, the Society for Assisted Reproductive Technology (SART), a division of the American Society of Reproductive Medicine (ASRM), has established a registry, with the most recent data available for calendar year 1994.[2]

These data encompass all 39,390 cycles initiated during that year as supplied by the 249 participating facilities. The overall success rate, measured by number of deliveries/retrieval for in-vitro fertilization (IVF), is 20.7%. Also, 3,119 cycles were initiated for the purpose of transferring donor oocytes: the success rate was 46.3% per retrieval. A total of 9.573 deliveries resulting from the various ART procedures was reported. Locally, the Women and Infants Hospital IVF program in 1994 attained a rate of 26.6% per retrieval.

A recent review assessed the impact of ART on the various causes of infertility.[3] Increased effectiveness was found for severe forms of tubal disease

and male infertility. For couples with endometriosis, refractory ovulatory disorders and less common diagnoses, ART does offer an option, although as yet differences in pregnancy rates have not reached statistical significance. Couples who present with unexplained infertility were found to have equal success rates initially with controlled ovarian hyperstimulation combined with intrauterine insemination.

History of Assisted Reproductive Endocrinology

Preliminary Research

Early primitive attempts at IVF and manipulation of oocytes date back to 1878. More sophisticated studies at that time were beyond the capabilities of the standard light microscope but became possible with the introduction of phase-contrast microscopy. Heape, at the turn of the last century, flushed rabbit embryos from the oviduct with physiologic saline followed by successful transplantation into a host with subsequent normal development and birth. Thibault's group is credited with the first accepted report on IVF research in 1954.[4]

Human Studies

Rock and Menkin were the first to report successful IVF (albeit without a viable pregnancy) in humans. In 1944, they retrieved eggs via laparotomy in the late follicular phase following which they washed them in Locke's solution and incubated them in homologous serum for 27 hours.[4]

The father of IVF, Robert Edwards, began his research on human eggs in 1963, and published his first paper in 1965 after dissection of large follicles from surgically removed ovaries. He then punctured the follicles to release the oocytes into media. His research was greatly facilitated by the introduction of human menopausal gonadotropin (hMG) in the late 50's and early 60's. Human menopausal gonadotropins, consisting of FSH and LH, allowed pharmacologic doses of ovarian stimulating hormones to be employed, thus providing for the routine development and recruitment of more than one egg. In 1968, Edwards read an article by Patrick Steptoe on laparoscopy and ovulation and called him, proposing a collaboration. Their combined work allowed oocytes to be retrieved by laparoscopy. Their first success, in 1976, unfortunately resulted in an ectopic pregnancy. The second IVF pregnancy resulted in the birth of Louise Brown, born in 1978.[4]

Eight percent of all married childless women are estimated to have sought infertility services within the last year.

The Birth of the American In Vitro Fertilization Program

At age 67 and 65, respectively, Drs. Howard and Georgeanna Seeger Jones were ready to retire. In 1978, they moved from the Johns Hopkins University School of Medicine to the Eastern Virginia Medical School. "But on the day we arrived [in Norfolk], July 25, 1978, Louise Brown was born in England. A local reporter called and said, 'Could this be done here?' I said, 'Why not? . . . All it would take would be a little money.'" A former patient read the quote and donated money towards this cause leading to the start of IVF in America. After many public hearings, permission was obtained at local, regional and state levels.[5] In 1981, Elizabeth Carr was born, the first United States IVF baby.

Other Related Technologies

Gamete Intrafallopian Transfer (GIFT) was first reported by Ricardo Asch in 1985 - as a Letter to the Editor in *Lancet,* chosen for its widely read subscription base as well as the speed of publication turnaround for letters. GIFT involves placing the gametes (sperm and eggs) into the fallopian tube. The major advantage is that it uses any unknown tubal secretions which may facilitate conception. Furthermore, there may be greater synchrony between the time the embryos arrive into the uterus and the stage of development of the endometrium, thus increasing the chance of successful implantation when compared to embryo transfer with IVF. Also, if a particular program's laboratory and culture techniques are not advanced, this technique takes advantage of the body's own incubator (ie. the fallopian tube). Finally, because fertilization does not take place outside of the body, GIFT may be more appealing to couples who for religious reasons cannot consider IVF.

The major downside of GIFT is that it requires a laparoscopy for transfer of the gametes. Another shortcoming is the lack of information obtained about fertilization if no pregnancy is achieved. Fortunately, extra oocytes (that are not placed back in the fallopian tubes) may be attempted to be fertilized with resulting embryos frozen. In the presence of significant male factor or tubal disease, GIFT is not appropriate. To address the limitations of GIFT, zygote intrafallopian transfer (ZIFT) and tubal embryo transfer (TET) were introduced. The concept behind these techniques is to perform a typical IVF oocyte retrieval and allow fertilization to occur in vitro. Following this, the zygote (i.e. the embryo at the pronuclear stage following fertilization right before its first division) or embryo is then placed laparoscopically into the fallopian tube. As such, ZIFT combines the advantage of documented fertilization (and placement of the best embryos) along with the utility of any tubal contribution. Although retrospective data suggest that GIFT and ZIFT may be associated with higher pregnancy rates than traditional IVF, all prospective randomized studies show no significant difference, most likely reflecting patient selection. Furthermore, GIFT may be becoming less common because, in addition to the prospective data showing no difference in pregnancy rates, IVF pregnancy rates have been steadily increasing while GIFT pregnancy rates have plateaued. GIFT is more costly financially and invasive to patients, requiring additional anesthesia and a laparoscopy.

Ovulation Induction with Intrauterine Insemination

In 1987, almost ten years after the birth of the first IVF baby, Dodson et al.[6] reported using gonadotropin superovulation induction in conjunction with intrauterine insemination. In contrast to IVF, in which the eggs were harvested and removed from the body and placed in proximity to sperm in a petri dish, ovulation induction releases the eggs in vivo and allows them to be picked up by the fallopian tubes.

Interestingly, this article was initially rejected because it was felt to be too controversial as well as deviating from the standard of care, based on the fact that the treatment was being advocated for women with normal fallopian tubes who were already ovulating. After having the manuscript rejected, the senior author contacted the editors at *Fertility and Sterility* and stated that much of the same critiques could be said for IVF and, in fact, the patients for whom this treatment was being considered would most likely be offered IVF if ovulation induction was not available. The manuscript was subsequently accepted. Superovulation in conjunction with intrauterine insemination has, through prospective randomized trials, now become a firmly established treatment for infertile couples.

Cryopreservation

The first human pregnancy resulting from a cryopreserved human embryo was reported in 1983, followed a year later by the report of the first live birth. One concern over long-term storage is exposure to background ionizing radiation which may damage DNA during storage. However, it is estimated that it would take more than 2,000 years before enough radiation damage would accrue to lead to a significant genetic anomaly.

Intracytoplasmic Sperm Injection (ICSI)

The injection of a single sperm into a mature egg has been one of the revolutionary advances in IVF. ICSI is designed to overcome sperm's inability to penetrate the zona pellucida and to treat fertilization failure. ICSI was first used successfully in humans at the Free University in Brussels with deliveries reported in 1992.

Indications for ICSI include fertilization failure as well as low sperm counts. In cycles in which couples have inexplicably not had fertilization, despite normal appearing sperm and eggs, ICSI often will yield normal embryos. Men with sperm counts that previously would have completely negated any chance of pregnancy, other than with donor sperm, are also excellent candidates for ICSI. In addition, sperm may be obtained through epididymal aspiration in men without a patent vas deferens as well as through testicular biopsy.

Egg Donation

The first successful pregnancy established with egg donation was reported in 1983 and was followed by the first successful replacement of donor embryos in 1984. The major candidates for donor eggs are women with non-functioning gonads. This population includes women who have gonadal agenesis or dysgenesis or premature ovarian failure (from natural causes or induced by chemotherapy or radiation therapy) as well as women who have had their ovaries surgically removed. There are several major differences between the donation of female gametes (oocytes) and male gametes (sperm). One obvious difference is the ease of obtaining a single specimen. In addition, although sperm can be frozen, no similar technology currently exists for eggs. This is important because it limits the ability to screen for conditions with incubation states such as HIV as well as necessitating that the retrieval and transfer are done at one site.

There are two general ways to obtain eggs for donation; known or anonymous. When patients bring their own donors, they are usually family members or close friends. Alternatively, an IVF program may recruit women to donate their eggs. Anonymous donors may include patients going through an IVF cycle who anticipate additional eggs above those needed for their own use or women who undergo IVF purely to obtain eggs for donation.

Interestingly, the risk of genetic abnormalities and miscarriage rates as well as the success in any one cycle reflects the age of the donor, as opposed to the age of the recipient. Reports of women in their 50's and 60's having babies via IVF with donor eggs further confirm this principle.[7]

Preimplantation Genetic Testing

With the progression in the mapping of the human genome as well as the development of probes and markers, the field of preimplantation genetic diagnosis has been accelerating. Techniques include polar body analysis, blastomere biopsy, and trophectoderm biopsy at the blastocyst stage. DNA amplification procedures such as PCR use followed by fluorescence in-situ hybridization (FISH) or similar techniques permit the placement of embryos that are known to be free of the tested condition. Literature to date does not suggest any adverse sequelae from this process.

American Society for Reproductive Medicine

History

The American Society for the Study of Human Sterility was founded in 1944. In 1946 "Human" was dropped in the title and the membership list was extended. In recent years, the society has significantly expanded its scope and membership by admitting Ph.D.'s, urologists and andrologists. In 1965, the society's name was changed to the American Fertility Society. More recently, the name has been changed to the American Society for Reproductive Medicine, to reflect changes in the field including the emphasis on menopause.

In its current state, the American Society for Reproductive Medicine is probably the single most influential body in the field of reproductive medicine, both nationally and internationally. In addition to its annual meeting and its frequent symposiums, ASRM

provides technical bulletins overviewing all aspects of reproductive medicine.

Guidelines for Provision of Infertility Services

Based on ASRM guidelines for the provisions of infertility services, providers for the assisted reproductive technologies, in addition to the ability to provide all lesser care, should have certified or documented experience in these technologies with infertility and counselling services available. These practitioners should be able to manage complicated anovulation, endometriosis, and tubal disease as well as complicated male infertility and provide direct access to male and female microsurgical services in addition to the assisted reproductive technologies and their related services.

Current status of ART in the United States

The success of IVF and related therapies has been dramatic in some clinical situations (tubal factor initially and male causes more recently). Less verifiable, but probably also of major importance, has been the improved appreciation of aspects of normal reproductive physiology learned from ART. Some authors, however, have criticized its current pattern of use because of its somewhat unphysiologic characteristics (parenteral medication, surgical ovum retrieval, need for complex laboratory support, frequency of multiple pregnancy and, most often, cost).

At present approximately 250 facilities initiate around 40,000 patient cycles/year in the United States, resulting in 10,000 deliveries/year. Costs per delivery, which include obstetrical and neonatal expenses as well as those directly related to the treatment, range from a low of $39,000/delivery to a high of nearly ten times that figure.[8] Nonetheless, the cost of adding such services to a typical employer health plan was projected to require a premium rise of only $3.14 per year per subscriber.[9] The largest single variable which is amenable to physician/patient control is the number of multiple pregnancies. Other appealing strategies for improving both outcomes and cost-effectiveness, not yet sufficiently reliable for routine use, include ovum retrieval from natural cycles, obtaining and preserving immature oocytes for later maturation, microsurgical or other techniques for improving successful implantation and documentation morphologically of pre-embryos with superior developmental potential.

References

1. Abma J, Chandra A, Mosher W, Peterson L. *Fertility, family planning, and womenís health: New data from the 1995 National Survey of Family Growth.* National Center for Health Statistics, Vital Health Stat. 1997;23.
2. Society for Assisted Reproductive Technology. Assisted reproductive technology in the United States and Canada: 1994 results generated from the American Society for Reproductive Medicine/Society for Assisted Reproductive Technology Registry. *Fertil Steril* 1996;66:697-705.
3. Shushan A, Eisenberg VH, Schenker JG. Subfertility in the era of assisted reproduction: changes and consequences. *Fertil Steril* 1995;64: 459-469.
4. Perone N. In Vitro Fertilization and embryo transfer: A historical perspective. *J Reprod Med* 1994;39:695-700.
5. Duka WE, DeCherney AH. *From the Beginning: A History of the American Fertility Society 1944-94.* Birmingham, Alabama. The American Fertility Society 1994.
6. Dodson WC, Whitesides DB, Hughes CL, et al. Superovulation with intrauterine insemination in the treatment of infertility: a possible alternative to gamete intrafallopian transfer and in vitro fertilization. *Fertil Steril* 1987;48:441-5.
7. Van den Eede, B. Investigation and treatment of infertile couples: ESHRE guidelines for good clinical and laboratory practice. *Hum Reprod* 1995;10:1246-71.
8. Goldfarb JM, Austin C, Lisbona H, Reskin B, Clapp M. Cost-effectiveness of in-vitro fertilization. *Obstet Gynecol* 1996;87:18-21.
9. Collins JA, Bustillo M, Visscher RD, Lawrence LD. An estimate of the cost of in-vitro fertilization services in the United States in 1995. *Fertil Steril* 1995;64:538-545.

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The Assisted Reproductive Technologies Laboratory and Intracytoplasmic Sperm Injection

Richard J. Hackett, MS, and Robert N. Clarke, PhD

Assisted Reproductive Technologies Laboratory

The Assisted Reproductive Technologies (ART) Laboratory, an integral part of an Assisted Reproduction Program, is responsible for all aspects of egg and embryo care. Personnel in the ART Laboratory must be highly trained and knowledgeable in all laboratory techniques, including egg identification, sperm processing, embryo culture and transfer, embryo freezing, and micromanipulation. Other factors important to the success of an ART Laboratory include physical aspects of the laboratory, the choice and maintenance of laboratory equipment, and the culture environment.

Physical Layout and Air Quality

An important factor is the proximity of the ART lab to the operating room (OR) where the eggs are collected. Ideally, a laboratory will be connected to the OR for the quick and safe transport of eggs from the physician to the embryologist. In addition, the laboratory should be designed to facilitate access from the incubators to the microscopes, minimizing the time that the embryos and gametes are out of the incubator.

The quality of air in the laboratory working environment is crucial to providing optimal conditions for egg and embryo development. Ideally, ART laboratories should utilize high efficiency particulate air (HEPA) filtration with a 99.9% efficiency rating. A less costly option is to use flow laminar hoods for providing HEPA-filtered air during gamete and embryo manipulation. Absence of a high quality air handling system can lead to the presence of airborne contaminants, which may disrupt cell cultures and thus, the potential success of the ART procedure.[1]

Equipment in the ART Laboratory

The mainstay is the incubators, which provide eggs and embryos with a closely controlled environment for growth and development. Moreover, it is important to provide adequate monitoring of the critical elements of the incubator environment and to perform preventative maintenance to ensure optimal performance. At the Women and Infants' ART Laboratory, incubators are checked each morning to ensure optimal incubator performance. Daily measurements include the internal chamber temperatures (as measured by thermometers) and the carbon dioxide (CO2) content of the incubator environment. The conditions under which egg and embryo cultures are cultured must be monitored often, with corrective action taken when needed.

While incubators are important in providing an adequate environment for egg and embryo cultures, microscopes are essential for allowing embryo technologists to assess the status of the ART process. Of the microscopes available in the ART Laboratory, the inverted microscope is most often used when assessing fertilization and embryo quality, as well as for microinjection of sperm into eggs. Evaluations are performed on a heated stage under high magnification (400x), which allows the embryologist to study fine intracellular detail.

Abbreviations Used:

ART	assisted reproductive technologies
C	centigrade
CO_2	carbon dioxide
COC	cumulus-oocyte-complex
HEPA	high efficiency particulate air
HTF	human tubal fluid
hr	hour
ICSI	intracytoplasmic sperm injection
IVF	in vitro fertilization
OR	operating room
PVP	polyvinylpyrillidone
SSS	synthetic serum substitute
ul	microliter
WIH	Women and Infants' Hospital

Culture Environment

The culture media used is very important to the success of the ART Program. Most labs performing assisted reproduction use CO_2 incubators with a 5% CO_2 in air environment. Incubators are kept at a constant temperature of 37 - 38°C. Historically, Hams F-10 (Gibco Scientific, Grand Island, NY) and Human Tubal Fluid (HTF; Irvine Scientific, Irvine, CA) have been the media of choice when performing *in vitro* fertilization (IVF) or other assisted reproductive techniques. These media contain sodium bicarbonate which interacts with the CO_2 in the incubator environment to maintain a constant pH range of culture media (7.2-7.4) that will promote optimal egg and embryo development. More recently, a new generation of media have been formulated, characterized by removal of glucose and phosphate; these compounds have been found to be detrimental to early embryo development.[2,3] One such medium, P1 (Irvine Scientific) is currently used at the Women and Infants' ART Laboratory. Regardless of the medium used, a protein supplement is generally added to optimize embryo growth. The source of this protein supplement can vary from natural additives (human serum) to mostly synthetic supplements, such as Synthetic Serum Sub-

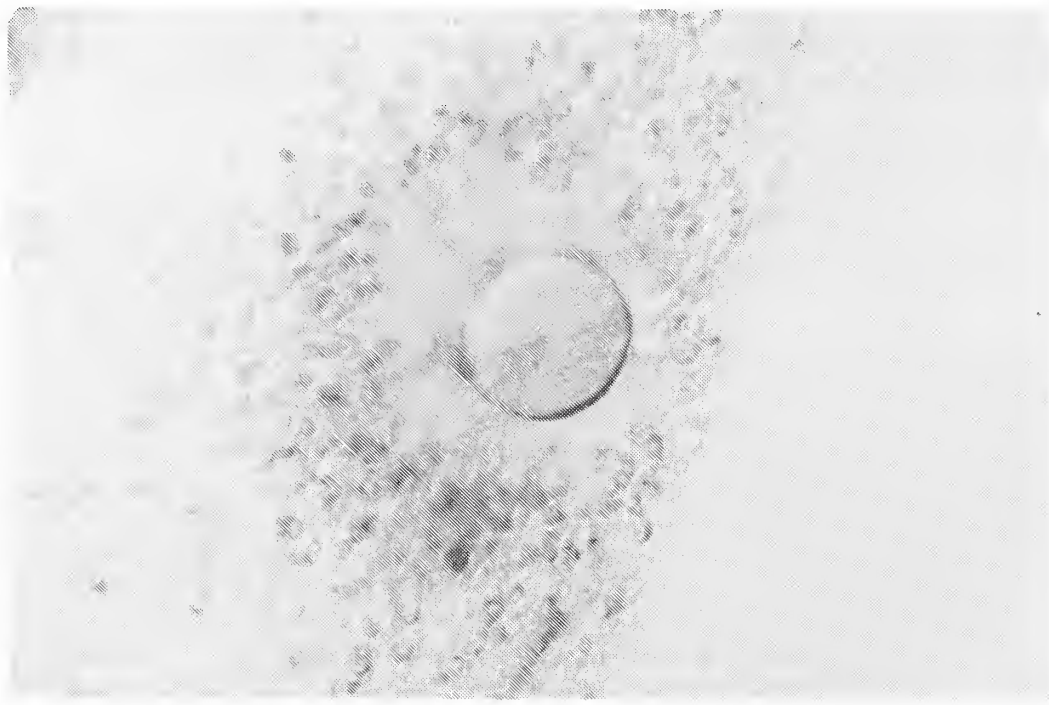

Figure 1: A cumulus oocyte complex, illustrating a human egg with associated cumulus and corona radiata cells.

stitute (SSS; Irvine Scientific).

It is important to minimize fluctuations in temperature and pH of egg and embryo cultures. Specimen dishes must be removed from the incubator periodically for evaluation and/or manipulation of the eggs or embryos. Because a bicarbonate buffered medium is used for culture, the pH will increase quickly when exposed to air, and can reach toxic levels within minutes. To counteract this problem, the ART laboratory staff at Women and Infants' cultures all specimens under a layer of oil. The oil serves to minimize both pH and temperature fluctuations in the culture dishes. In addition, stage warmers are placed on all microscopes to help preserve the optimal temperature of the media.

Basic ART Laboratory Techniques

Oocyte Retrieval

As a result of ovulation induction therapy in preparation for ART, multiple follicles are recruited, each of which will, theoretically, contain an egg (or oocyte). During the oocyte retrieval, oocytes are aspirated from the follicles using a long needle with ultrasound guidance. The follicular fluid aspirates containing the eggs are collected by suction into pre-warmed sterile test tubes, which are given to the laboratory personnel for detection of the eggs. At the Women and Infants' ART Program, the OR is directly connected to the laboratory and test tubes containing follicular fluid are given to lab personnel through a pass-through window, usually within 30 seconds after aspiration. This helps to reduce temperature fluctuations in the fluid samples and minimizes exposure of the eggs to potentially damaging contaminants, such as blood.

Much of the success of an assisted reproductive technology cycle is determined by the quality and selection of the embryos to transfer back to the patient.

Once the laboratory receives the follicular fluid samples, the eggs are identified. Eggs are generally seen in association with surrounding follicular cells known as cumulus cells, and are collectively called the cumulus-oocyte complex (COC; Figure 1). The COC is removed from the follicular fluid and placed in culture medium, where a majority of the cumulus cells are trimmed away from the oocyte. The oocyte with a small amount of surrounding cumulus is transferred to a small (100ul) drop of P1 medium supplemented with 6% SSS under oil and quickly placed in a CO2 incubator.

After collection of the oocytes, some laboratories will grade the COC's according to the maturity of the surrounding cumulus cells.[4] Whether or not the classification of oocytes is clinically relevant remains unclear. Moreover, while it may serve to identify mature eggs in some cases, most laboratories inseminate eggs at a set time after collection, regardless of the grading, because many eggs that are slightly immature will continue to mature during the insemination period, and fertilization will occur later. In these cases, the assessment of oocyte maturity at retrieval may only serve to further disturb the external milieu of the egg.

Semen Analysis and Sperm Preparation

A semen sample is collected from the male partner on the day of oocyte retrieval. Semen is comprised of sperm cells and seminal plasma secreted from the male accessory glands during ejaculation. Immediately after ejaculation, semen has a gel-like consistency which will dissolve over a period of 45-60 minutes, a process known as liquefaction. Once liquefied, the seminal plasma portion of the ejaculate must be removed in order for sperm to undergo the processes necessary for acquiring fertilizing potential.[5] This is done in the laboratory by twice washing the sperm with a modified HTF medium, followed by further processing to isolate a highly motile fraction of sperm cells free of debris or other cellular and acellular contaminants. This can be accomplished using many different types of processing techniques, the most commonly used being the Percoll gradient technique and the swim-up procedure.

The Percoll gradient method[6] is often used for processing semen for IVF, and is the method of choice when preparing samples of poor quality (low sperm counts, poor sperm progression) for insemination or sperm injection.

Percoll is a suspension of silica particles coated with polyvinylpyrillidone. Solutions of differing densities of Percoll (or other similar products) are prepared and layered on top of each other (in order of decreasing densities) in a conical test tube. Usually, two density layers are used (such as 40% and 80%). The washed sperm pellet is layered on top of the Percoll gradient and centrifuged at low speed, after which a highly motile sperm fraction can usually be found at the bottom of the tube. This motile fraction is removed and placed in a fresh tube and washed twice with medium to remove the Percoll. The final pellet is resuspended in P1 medium and is placed in the CO2 incubator until ready to inseminate the eggs.

Another useful method for processing sperm for IVF and other assisted reproductive techniques is the swim-up method.[7] This method does not use a density gradient such as Percoll, but relies on the motile sperm to separate out "naturally" from the non-motile fraction of sperm. After washing, the sperm pellet is covered with a small volume of P1 medium and placed in the incubator for 1-1.5 hr. During the incubation period, motile sperm swim up into the media overlay, leaving dead and immotile sperm remaining in the pellet. After incubation, the media overlay is removed and placed into the CO2 incubator until used for insemination of the eggs. The advantages of the swim-up method are that it is easy to perform and minimizes centrifugation of the sperm sample. It is generally not used, however, in cases of low sperm concentration or otherwise poor quality, where the Percoll method is better suited for acquiring adequate numbers of motile sperm.

Figure 2: The WIH Embryo Scoring System

48 Hour Embryo Evaluation

Cell Number	Score
4-6 cell	4
3-cell or > 6-cell	3
2-cell	2
1-cell (late fertilization)	1
1-cell (no cleavage)	0

72 Hour Embryo Evaluation

Cell Number	Score
8-10 cell	4
6-7 cell or >10 cell	3
4-5 cell	2
2-3 cell	1
1 cell	0

Degree of Fragmentation

Degree of Fragmentation	Score
0%	4
<10%	3
10-25%	2
26-50%	1
>50%	0

Blastomere Symmetry

Blastomere Symmetry	Score
Symmetric/slightly asymmetric	1
Asymmetric	0

Figure 2: The Women and Infants' Hospital (WIH) Embryo Scoring System. Scores originating from embryo development (based on the day of observation), degree of fragmentation, and blastomere symmetry are added together to obtain a total embryo score. Embryos are scored on Days 2 and 3 of culture.

Insemination and Fertilization Assessment

In the IVF procedure, the most common of all ART's, the eggs and sperm are combined in a petri dish approximately 4-8 hours after egg collection. At the Women and Infants' ART Laboratory, sperm are added to eggs at a concentration of approximately 100,000 motile sperm/ml of incubation medium. In cases of reduced sperm counts, more sperm can be added in an attempt to increase fertilization; however, these patients more often benefit from intracytoplasmic sperm injection (ICSI).

After the sperm and eggs are combined, the dishes are returned to the CO_2 incubator and left overnight. Early the next morning (12-20 hr post-insemination), eggs are washed free of any remaining cumulus or corona cells, placed in fresh P1 medium supplemented with 10% SSS, and checked for evidence of fertilization. The appearance of two pronuclear or fertilization structures are evidence of successful fertilization (one pronucleus from the egg and one pronucleus originating from the sperm). Oocytes are categorized as either: normally fertilized (exhibiting 2 pronuclei); abnormally fertilized (> 2 pronuclei, evidence of polyspermic fertilization); one pronuclear (possible parthenogenic activation); or non-fertilized (no pronuclei visible). Eggs are checked a second time in the afternoon (4-6 hr after the first fertilization check) and again the following morning to identify eggs that may have fertilized late or had delayed pronuclear formation.

Embryo Grading and Selection

Much of the success of an ART cycle is determined by the quality and selection of the embryos to transfer back to the patient. Most embryo scoring systems use three criteria for determining embryo quality: the number of blastomeres; the equality of the size of the blastomeres; and the amount of

anucleate fragments.[8,9] At Women & Infants' ART program, a modified version of the standard scoring systems is used. The Women & Infants' Hospital (WIH) scoring system categorizes embryo cleavage such that embryos at the most appropriate stage of development are given the highest score. In addition, the degree of fragmentation and blastomere symmetry are categorized and added to the embryo development score to give the total embryo score (Figure 2).

In general, embryos with the highest score are considered first for transfer. It is also very important that there is evidence of cell division between the 48 hour and 72 hour observations of embryo development. If the embryos do not divide during this time, they are considered arrested in development and non-viable. Depending on the quality of the embryos, the age of the patient, the number of ART cycles the patient has been through, and the patient's inclination, a determination on the number of embryos to be transferred will made by the patient, with input from the Laboratory and the physician.

Embryo transfer

Catheters used for embryo transfer range from the Tomcat™ (Arista, New York, NY) catheter, which is a multi-purpose stiff end-loading catheter to the Wallace™ (Marlow Surgical Technologies, Inc., Willoughby, OH) catheter, specifically designed for human IVF. The Wallace™ catheter, a long very flexible catheter with a overlying sheath, causes less trauma to the uterus and the embryos. Its flexibility helps it to pass through the sometimes very serpentine path to the uterus.

For the embryo transfer, the patient is placed in stirrups and a speculum is used to visualize the cervix. The vagina and cervix are cleaned with culture media. The transfer catheter is flushed several times with sterile media and the embryo are loaded into the catheter in a 200 µl drop of media. The loaded catheter is brought to the physician and inserted through the endocervical canal into the uterus. Once the catheter is in the correct position, the plunger of the syringe is depressed and the embryos are injected into the uterus. When withdrawn and given back to the embryologist, the catheter and the sheath are flushed with media to be certain that no embryos were retained.

Embryo Freezing

The combination of fertility drugs producing large numbers of oocytes and high fertilization rates in the laboratory often results in excess embryos following the transfer. These residual embryos can be frozen, stored[10,11] and transferred back to the patient at a later time. Embryos are usually cryopreserved at one of three stages: the zygote (2 pronuclear; Day 1) stage; the early cleavage (2 - 8 cell) stage (Days 2-3); or the blastocyst stage (Days 5-6). Zygotes seem to tolerate the freezing process very well. Cryopreserving at the 2 - 8 cell stage takes place after the fresh transfer, allowing embryos of better quality to be chosen for the fresh transfer. Since the best quality embryos are being transferred, embryos of relatively poorer quality generally are frozen, some of which may not survive the freezing process.[12] Blastocyst freezing involves the cryopreservation of embryo following 5-6 days of culture, and also allows the benefit of greater selection for the fresh transfer. In addition, since only embryos reaching the blastocyst stage of development are frozen, this reduces the chances of cryopreserving poor quality embryos that may not survive the freeze/thaw process.[13] Unfortunately, at the present time, embryo culture systems do not support blastocyst development to a high degree (20-40%); thus, blastocyst freezing is not routine. Development of better culture media for human embryos may allow more blastocyst culture and freezing in the future.

Embryos are frozen with a biological cell freezer, which consists of a freezing chamber and a programmable computer which controls the rate of freezing. Most laboratories use liquid nitrogen vapor to depress the temperature in the freezing chamber, but some laboratories use a methanol bath with cooling coils to regulate temperature. At the Women & Infants' ART laboratory, embryos are frozen in straws at the 2 - 8 cell stage.[11] The embryos are introduced to increasing concentrations of the cryoprotectant 1,2-propanediol, which diffuses into the cell in a controlled fashion. Sucrose is added to the final cryoprotectant solution to remove some of the water from within the cells. Embryos are then aspirated into the cryopreservation straws, which are heat-sealed. Embryos are frozen at a rate of - 0.3°C to - 7°C, where they are seeded. Seeding involves the initiation of freezing of the cryopreservation solution. Once seeded, freezing continues to a temperature of - 30°C, where the straws are plunged into liquid nitrogen (-193°C). Frozen embryos are stored submerged in liquid nitrogen within large, temperature-controlled tanks.

Embryo Thawing

A patient may undergo a frozen embryo transfer (FET) in a natural cycle or in an hormonally controlled cycle depending on her individual cycle characteristics. The day prior to the planned transfer, straws containing the frozen embryos are thawed in a 37°C bath. The ends of the straws are cut open and their contents are carefully expelled into a culture dish. The embryos are then taken through a series of solutions with decreasing concentrations of cryoprotectant solution to gradually remove the cryoprotectant from the embryos. Once the cryoprotectant is removed, the embryos are placed in culture media and incubated overnight. The next day the viable embryos, which include those with at least 50% of their blastomeres intact, are transferred back to the patient.

Intracytoplasmic Sperm Injection (ICSI)

Since its introduction in 1992, ICSI has dramatically improved the ability to treat male factor infertility in that sperm no longer have to overcome the physical obstacles to gamete fusion. Patients that have an indication for ICSI are patients with failed or poor

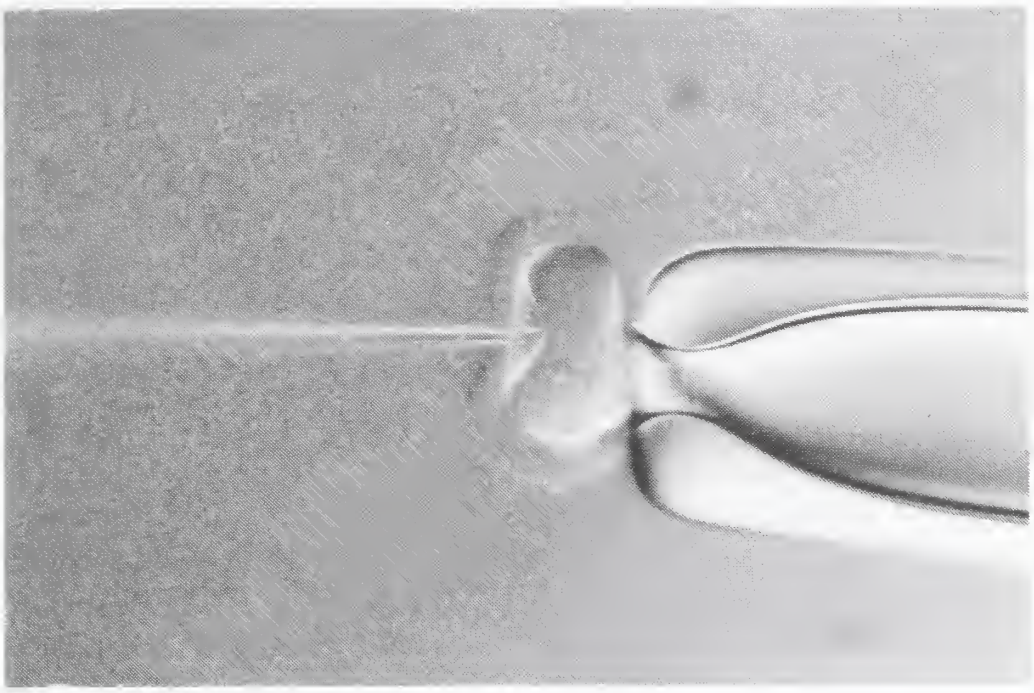

Figure 3: Intracytoplasmic sperm injection, showing a mature (metaphase II) egg at the point of injection with a needle containing a viable spermatozoon.

fertilization in a previous conventional IVF cycle, patients with poor ejaculated sperm parameters, and patients that undergo epididymal sperm aspirations or testicular biopsies due to lack of sperm in the ejaculate. ICSI is performed under high magnification (400x) using a microscope fitted with either Hoffman modulation or Nomarksi interference contrast optics. The microscope is also equipped with micromanipulators to perform ICSI. Micromanipulators are attached to glass tool holders to translate fine hand movements into micromanipulation tool movements under the microscope. The ICSI micromanipulation tools consist of the holding pipet, which holds the oocyte in place and the ICSI needle, which is used to inject the sperm into the oocyte.

An ICSI cycle is identical to a conventional IVF cycle until the time of insemination.[14] For ICSI, the residual granulosa cells are enzymatically and mechanically removed from the oocyte. The oocytes are then examined for nuclear maturity, with only mature (metaphase II) oocytes being used for ICSI. During the ICSI procedure, the oocyte is placed in a 5 µl drop of media under oil. A separate drop of polyvinylpyrrolidone (PVP) is placed in the center of the dish, to which 1 µl of processed sperm is added. The PVP serves to slow down the sperm so it can be manipulated more easily. The sperm drop is searched for viable (motile) spermatozoon with a normally sized and shaped head. Once a suitable spermatozoon is located, the ICSI needle is brought down across the sperm tail just below the midpiece. This action will immobilize the spermatozoon, which is then aspirated into the ICSI needle tail first. The ICSI needle is then moved over to the oocyte at the 3 o'clock position pressing it against the zona pellucida. The spermatozoon is brought to the tip of the needle, and the needle is pushed into the oocyte (Figure 3). Once in the ooplasm, some cytosol is aspirated into the ICSI needle to be certain the membrane is broken. The contents of the ICSI needle (including the spermatozoon) are expelled back into the oocyte and the needle is withdrawn.

ICSI in severe male factor patients will often yield fertilization and pregnancy rates that are equivalent to conventional IVF in non-male factor patients. Prenatal diagnosis and postnatal follow-up indicate that there is no increase in congenital abnormalities in ICSI babies compared to those in children resulting from natural conception.

References

1. Hammitt D. Laboratory design, biohazards, and waste. In: *American Fertility Society Postgraduate Course, Reproductive Biology: Clinical and Basic Perspectives, Part I: Preparing the Andrology and ART Laboratory for Inspection and Accreditation.* 1991;94-109.
2. Quinn P. Enhanced results in mouse and human embryo culture using a modified Human Tubal Fluid medium lacking glucose and phosphate. *J Asst Repro Genet* 1995;12:97-104.

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3. Bavister BD. Culture of preimplantation embryos: facts and artifacts. *Human Reprod Update* 1995;1(2):91-148.
4. Veeck L. Oocyte assessment and biological performance. *Ann NY Acad Sci USA* 1988;541: 259-262.
5. Yovich, JL. Sperm preparation for assisted conception. In: *Gametes - The Spermatozoon* (JG Grudzinskas and JL Yovich, eds.), Cambridge Reviews in Human Reproduction, Cambridge University Press, UK, 1995:268-281.
6. Lessley BA, Garner DL. Isolation of motile spermatozoa by density gradient centrifugation. *Percoll Gamete Res* 1983;7:49-61.
7. Lopata A, Patullo MJ, Chang A, James B. A method for collecting motile spermatozoa from human semen. *Fertil Steril* 1976; 27:677-684.
8. Steer C, Mills C, Tan S, et al. The cumulative embryo score: A predictive embryo scoring technique to select the optimal number of embryos to transfer in a in-vitro fertilization and embryo transfer programme. *Hum Reprod* 1992;7:117-119.
9. Puissant F,Van Rysselberge M, Barlow P, et al. Embryo scoring as a prognostic tool in IVF treatment. *Hum Reprod* 1987;8:705-708.
10. Trounson A. Cryopreservation. *Brit Med Bull* 1990;46:695-708.
11. Testart J, Lassalle B, Belaisch-Allart J, et al. High pregnancy rate after early human embryo freezing. *Fertil Steril* 1986;46:268-272.
12. Lassalle B, Testart J, Renard J. Human embryo features that influence the success of cryopreservation with the use of 1,2-Propanediol. *Fertil. Steril* 1985;44:654-651.
13. Fehilly C, Cohen J, Simons R, et al. Cryopreservation of cleaving embryos and expanded blastocyst in the human: A comparative study. *Fertil Steril* 1985;44:638-644.
14. Van Steirteghem A, Lui J, Joris H, et al. Higher success rate by intracytoplasmic sperm injection than by subzonal insemination. Report of a second series of 300 consecutive treatment cycles. *Hum.Reprod* 1993; 8:1055-1060.

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Aging and Infertility in Women

David L. Keefe, MD

Women, like females of most mammalian species, experience reproductive decline with age, ending in complete loss of fertility by mid-life, even though there are still primary oocytes within the ovary.[1] Study of reproductive aging in women is of interest because age-related decline of reproductive function in women is associated with a number of adverse conditions of public health importance, including cardiovascular disease, osteoporosis, and aneuploidy. Moreover, because of social changes many women now delay childbearing until their late 30's, when the effects of age on fertility start to become clinically significant.

Demographic, anthropological, historical, and clinical studies of diverse populations demonstrate that female fecundity declines with age, even after controlling for other causes of infertility. While most studies on reproductive aging in humans do not distinguish among the many potential effects of age on fertility, studies on the efficacy of artificial insemination of normal women of different ages with donor sperm (AID) from normal men provide evidence of direct effects of age on female fertility. The success rate of AID varies inversely as a function of the woman's age, suggesting that female fertility declines with age.[2] Indeed, age provides the single best predictor of success after a number of infertility treatments, such as in vitro fertilization and empiric superovulation.[3]

The Oocyte is a Locus of Reproductive Aging in Women

While age affects nearly every aspect of female reproduction, the oocyte is believed to be a major locus of reproductive aging in women, if for no other reason than oocytes are so long-lived. In humans all oocytes arise during the antenatal period, and cease mitotic division after arresting in prophase of meiosis I. Oocytes not only fail to divide, they also undergo progressive atresia, so that by mid-life the population of oocytes, which once exceeded seven million, numbers only several thousand. Thus, one effect of age on oocytes is progressive depletion.

Abbreviations Used:

AID	artificial insemination with donor sperm
IVF	in vitro fertilization
mtDNA	mitochondrial DNA
Oxphos	oxidative phosphorylation
PCR	polymerase chain reaction
ROS	reactive oxygen species
tRNA	transfer ribonucleic acid

Age also diminishes the "quality" of oocytes, which refers to their developmental potential, i.e. the ability to be fertilized, divide and give rise to pregnancy. Evaluation of oocyte quality has been difficult in humans. Attempts to estimate oocyte developmental potential have depended upon analyzing the morphology of oocytes and embryos obtained in the course of in vitro fertilization cycles. Clinical morphologic grading of oocytes and embryos from middle-aged women demonstrate a number of morphologic features associated with poor developmental potential, such as darkness, granularity, vacuoles, fragmentation and irregularity. However, clinical morphological grading has met with limited success, in part because only semi-quantitative scoring systems have been employed. Better methods of evaluation are needed to put the field on a firmer footing.

The most direct assessment of oocyte quality in humans is provided by their probability of giving rise to pregnancy after in vitro fertilization. In vitro fertilization (IVF), a widely used technology for the treatment of many forms of infertility, offers the opportunity to study human oocyte developmental potential by observing embryo behavior in culture after fertilization, and by determining embryo implantation rate after transfer. IVF provides unique insights into reproductive aging in women because early events of human reproduction, which normally occur internally, can be observed in the laboratory.

Abundant evidence from IVF demonstrates that age reduces "oocyte quality." Indeed, in multivariate analysis age is the single best predictor of pregnancy for women undergoing IVF.[3] The earliest effect of age on IVF outcome is reduction of embryo implantation rate. Later the number of oocytes retrieved and the fertilization rate both decrease.

Perhaps the most direct evidence for oocyte senescence in humans is the finding that donation of oocytes from young to older women abrogates the effects of age on fertility.[4] In this technology oocytes from young women are retrieved, fertilized in vitro with sperm from the recipient's partner, and then transferred into the recipient's uterus or Fallopian tube. The clinical pregnancy rate for women with age-related reproductive failure undergoing oocyte donation-IVF exceeds 45% per transfer, about ten times the IVF pregnancy rate when these patients use their own oocytes. Indeed, pregnancy has been achieved by transferring fertilized oocytes retrieved from young donors into the uteri of women more than a decade past menopause. Further evidence of the effect of age on oocyte fecundity is the finding that the age of the oocyte donor is inversely related to the pregnancy rate in the recipient.

As in other tissues, the aging process does not affect all women, nor all oocytes from the same woman, at the

same rate. For example, some young women suffer from "oocyte factor" infertility.[5] Embryo morphology and implantation rate in these women resemble those of women near the end of their reproductive lives, and the women become pregnant after oocyte donation therapy. Conversely, some women remain highly fertile well into their forties. The inherent features of the oocyte, i.e. morphology, physiology and molecular biology, which determine its developmental potential, and how age affects these features are unclear at present.

Oxygen Radical Damage Accumulates in Long Lived Cells

Studies of cellular senescence in a wide variety of species have demonstrated a number of universal mechanisms underlying the aging process. Perhaps the most comprehensive and well-established theory of aging, the oxygen radical theory first proposed by Harmon, suggests that organisms age because of accumulation of oxygen radical-induced cellular damage.[6] Oxygen radicals, or reactive oxygen species (ROS), are natural byproducts of oxidative metabolism, which cause irreversible injury to lipid membranes, proteins and nucleic acids, and lead to accumulation of malonaldehyde, lipofuscin and dityrosine within cells. The presence of unpaired electrons in some ROS's makes these intermediates highly unstable. Much of the damage caused by ROS in cells results directly from lipid peroxidation, which leads to membrane damage due to rigidification and secondary generation of lysophospholipids. DNA and protein damage also are induced by ROS.

Mitochondria are Susceptible to Oxidative Damage

Investigators have focused on the role of mitochondria in aging because of the central role of that organelle in the generation of ROS, and because of its susceptibility to oxygen radical damage.[7] Mitochondria generate ROS in the course of energy production by oxidative phosphorylation (oxphos). Oxphos is carried out by five enzyme complexes assembled by subunits derived from both nuclear DNA and mitochondrial DNA (mtDNA). Each mitochondrion generates about 10-[7] reactive oxygen species per day. Disruption of oxphos increases even further the level of ROS within mitochondria. Cells maintain a number of defenses against ROS, including water and lipid-soluble ROS scavengers, such as ascorbic acid, B-carotene and vitamin E, enzymes such as catalase, glutathione peroxidase, and superoxide dismutase, and cellular compartmentalization of ROS- generating enzymes within membrane-bound mitochondria and peroxisomes.

Because of social changes many women now delay childbearing until their late 30's, when the effects of age on fertility start to become clinically significant.

Mitochondrial damage is thought to underlie the age-related loss of function characteristic of long-lived tissues, such as brain, heart and muscle and possibly oocytes. Presumably the limited turnover of cells within these tissues is associated with delayed turnover of mitochondria, while their metabolic activity generates ROS. Most recently, several laboratories have reported that mtDNA from many tissues accumulates mutations with age, and mutations in mtDNA have been linked to senescence in many species besides man. The human mitochondrial genome is a 16,569 nucleotide pair (n.p.), closed, circular DNA, which has been completely sequenced. It encodes subunits of the enzyme complexes responsible for cellular oxphos (the remaining subunits are imported from the cytoplasm after translation from mRNA's encoded by the nuclear genome), as well as structural tRNA's and rRNA's necessary for mtDNA expression. The mitochondrial replication, transcription, and translation system shares many features with prokaryotic cells, which reflects its endosymbiotic origin.

MtDNA is especially susceptible to ROS-induced mutations because: 1) its location within the mitochondrial matrix places it in physical proximity to oxphos enzymes on the mitochondrial inner membrane, so that mtDNA is under constant attack by free radicals, 2) mtDNA is not surrounded by histones, which protect nuclear DNA against ROS, 3) mtDNA is more susceptible to environmental mutagens than nuclear DNA, because its small, superhelical structure more readily intercalates these chemicals, 4) lacking introns, mtDNA contains more densely packed information than nuclear DNA, so ROS "hits" to mtDNA stand a better chance of knocking out critical DNA, 5) mtDNA has minimal repair activity, 6) disruption of mtDNA-encoded oxphos subunits by mutation further increases ROS by disrupting orderly transmission of electrons down the oxphos pathway, 7) numerous repeated sequences predispose mtDNA to deletion mutations, creating deletion "hot spots."

Human Oocytes Harbor mtDNA Deletions

Because mutated mtDNA accumulates more rapidly in non-dividing cells than in rapidly dividing cells, the oocyte contains large numbers of mitochondria,8 and ultrastructural and light microscopic studies of oocytes and embryos describe changes consistent with oxygen-radical damage, we looked for deleted mtDNA in abnormal human oocytes by polymerase chain reaction (PCR).[9] The PCR strategy used to assay deleted mtDNA in oocytes depends on primers flanking the mtDNA deletion hot spot between n.p. 8468-13446. Under the conditions employed, the primers are too widely separated to amplify the 4978 n.p. product. However, large deletions in this region, such as those reported in other long-lived cells, bring the primers sufficiently close to facilitate

amplification by the polymerase chain reaction. MtDNA deletions could be detected in single oocytes. Since oxphos capacity is inversely proportional to levels of mutated mtDNA, oocytes with the most defective mtDNA would have the least energy-generating capacity and poorest developmental potential. Because of the critical role of mitochondria in cellular function and of the toxicity of ROS formed by dysfunctional mitochondria, the extent of mutated mtDNA in oocytes and early embryos could be a critical determinant of their developmental potential.

The Future:

Replacement of mutated mtDNA with normal mtDNA by nuclear transfer may provide effective treatment for some kinds of oocyte infertility.

Nuclear transplantation affords an opportunity to replace defective mitochondria with healthy mitochondria contained in cytoplasm from normal donor oocytes.[10] In this treatment donor and recipient both would undergo oocyte retrieval and IVF, followed by microsurgical transfer of the recipient's nucleus into an enucleated normal, donor oocyte. Nuclear transfer has been carried out safely in embryos from a number of mammalian species, including mice, rats, sheep, and cattle, and rabbits. While aging also may affect the nuclear genome, presumably mtDNA is more sensitive to the effects of ROS. Thus, nuclear transfer would enable some women with oocyte infertility to give birth to genetically-related children. It also would facilitate recruitment of oocyte donors, who would be less reluctant to donate oocytes, knowing that resultant offspring would not carry their nuclear genome.

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REFERENCES

1. vom Saal FS, Finch CE. Reproductive senescence: Phenomena and mechanisms in mammals and selected vertebrates. IN: E Knobil, J Neill et al (Eds). *The Physiology of Reproduction*. 1988.
2. Virro MR, Shewchuk AB. Pregnancy outcome in 242 conceptions after artificial insemination with donor sperm and effects of maternal age on the prognosis for successful pregnancy. *Am J Obstet Gynecol* 1984;148:518-524.
3. Hughes EG, King C, Wood EC. A prospective study of prognostic factors in in vitro fertilization and embryo transfer. *Fert Steril* 1989;51(5):838-844.
4. Navot D, Bergh PA, Williams MA, et al. An insight into early reproductive processes through the in vivo model of ovum donation. *J Clin Endoc Metab* 1991;72(2):408-414.
5. Ezra Y, Simon A Laufer N. Defective oocytes in a new subgroup of unexplained infertility. *Fertil Steril* 1992;58:24-27.
6. Harman D. The biologic clock: The mitochondria? *J Am Geri Soc* 1972;4:145-147.
7. Wallace DC. Diseases of the mitochondrial DNA. *Ann Rev Biochem* 1992;61:1175-1212.
8. Piko L, Matsumoto L. Number of mitochondria and some properties of mitochondrial DNA in the mouse egg. *Dev Biol* 1976;49:1-10.
9. Keefe D, Niven-Fairchild, Powell S, Buradagunta S. MtDNA deletions in oocytes and reproductive aging in women. *Fertil Steril* 1995;64:577-583.
10. McGrath J, Solter D. Nuclear transplantation in mouse embryos. *J Exp Zoology* 1983;228:355-362.

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Male Infertility

Mark Sigman, MD

Approximately 20% of cases of infertility are due entirely to a male factor; an additional 30% involve both male and female factors. Therefore, male factor infertility is involved in roughly 1/2 of infertility cases. Because of the advancing age of infertile couples, a basic, simple, cost-effective evaluation of both male and female should be initiated at the time of presentation. The approach to the evaluation of the infertile male should be similar to that used to evaluate other medical problems. A thorough history should be taken with particular attention to those areas that may effect fertility. This should be followed by a physical examination. An initial series of laboratory tests completes the basic evaluation. The results of the history, physical examination, and initial laboratory testing suggest a differential diagnosis that may lead to more specific testing. Many tests are available to evaluate different aspects of male infertility but not all patients need all tests. Ideally, the evaluation of the infertile male should result in the identification of the specific abnormality responsible for infertility. When possible, specific treatment is directed toward a specific etiology. Although this is possible in some cases, many men demonstrate abnormal semen analyses for which no etiology can be identified. Both empiric therapies and assisted reproductive techniques (ART) may be of value in the absence of

Abbreviations Used:

ART	assisted reproductive techniques
FSH	follicle stimulation hormone
LH	luteinizing hormone

TABLE 1

COMPONENTS OF THE HISTORY IMPORTANT FOR THE EVALUATION OF THE INFERTILE MALE

I. Sexual History

Duration of sexual relations with and without birth control

Methods of birth control

Sexual technique: Potency, use of lubricants (some are spermatocidal)

Frequency and timing of coitus

II. Past History

Developmental: History of cryptorchidism, age of puberty, gynecomastia, congenital abnormalities of urinary tract or central nervous system

Surgical: Orchiopexy, pelvic or retroperitoneal surgery, herniorrhaphy, sympathectomy, vasectomy, injury to genitals, spinal cord injury, testicular torsion

Medical: Urinary infections, sexually transmitted diseases, mumps, renal disease, diabetes, radiotherapy, recent febrile illness, epididymitis, tuberculosis, or other chronic diseases, anosmia, midline defects

Drugs: Complete list of all past and present medications. Many drugs interfere with spermatogenesis, erection, or ejaculation.

Occupation and habits: Exposure to chemicals and heat, hot baths, steam baths, radiation, cigarettes, alcohol, illicit drugs, and anabolic steroids.

Past history including pregnancies and offspring with other partners

Previous infertility evaluations and treatment

III. Family History

Testicular atrophy

Hypogonadotropism

Cryptorchidism

Congenital midline defects

Cystic fibrosis

IV. Female Reproductive History

Past history including pregnancies and offspring with other partners

Menstrual history

Infertility evaluations to date

TABLE 2

MINIMUM LEVELS OF ADEQUACY FOR SEMEN PARAMETERS

- A seminal volume of 1.5 to 5.0 ml
- A total sperm count of greater than 50 million
- Motility greater than or equal to 50%
- Forward progression greater than 2.0
- Fifty percent or more of sperm having normal morphology by standard criteria. Although by strict criteria abnormal samples are defined as having less than 14% normal forms, we have not found significant fertilization defects in most samples with greater than 1% normal forms using strict criteria.

TABLE 3

HORMONAL STATUS AS A FUNCTION OF CLINICAL DIAGNOSIS

Clinical Status	FSH (mIU/ml)	LH (mIU/ml)	Testosterone (ng/100 ml)
Normal men	Normal	Normal	Normal
Germinal aplasia	⇑	Normal	Normal
Testicular failure	⇑	⇑	Normal or ⇓
Hypogonadotropic hypogonadism	⇓	⇓	⇓

known etiologic factors. It is important to remember that therapeutic donor insemination and adoption are treatment alternatives.

History

The evaluation of the infertile male should include a thorough history exploring all aspects related to fertility (Table 1). Details of the length of infertility as well as the frequency of intercourse, should be obtained. Although there is some controversy, most experts advise intercourse approximately every 2 days during the time of ovulation. This insures that viable sperm are present during the 12 to 24 hour period in which the oocyte is within the fallopian tube and is capable of being fertilized. The male's developmental history should also be explored. Conditions such as cryptorchidism and testicular torsion result in decreased fertility in adulthood. Past surgical procedures such as bladder neck surgery or retroperitoneal surgery may interfere with ejaculation. Medical conditions such as diabetes and a past history of gential infections are important. Of significance, low sperm counts are identified in approximately 60% or more of patients with testicular cancer and lymphoma at the time of diagnosis. Chemotherapy or radiation therapy may further impair testicular function. Spermatogenesis may take up to 4 to 5 years to return following radiation therapy or chemotherapy. Following a febrile illness, spermatogenesis may be impaired for 1 to 3 months. Many medications and drugs including nitrofurantoin, cimetidine, sulfasalazine, cocaine, nicotine and marijuana have been implicated as impairing spermatogenesis. The use of anabolic steroids may cause hypogonadotropic hypogonadism resulting in infertility. Testicular temperatures are normally 1.0 to 2.5 degrees Fahrenheit below body temperature. Impaired semen quality and spermatogenesis have resulted from experimental hyperthermia. Similarly, the frequent use of hot tubs has been found to result in a 10% decrease in sperm motility. Therefore, patients with suboptimal semen analyses should discontinue use of saunas and hot tubs. There is no scientific evidence that jockey shorts effect spermatogenesis.

Male infertility is involved in roughly one-half of infertility cases.

Physical Examination

The physical examination should be geared toward identifying any abnormalities that may be associated with infertility. The patientís habitus as well as the pattern of virilization should be noted. Situs inversus raises the possibility of Kartagener's syndrome associated with immotile cilia. Specific attention should be directed toward the genital examination. The penis should be examined for evidence of hypospadias which may interfere with cervical deposition of sperm. Similarly, severe chordee may interfere with intercourse. The testes should be palpated for consistency and size. Because the majority of testicular volume consists of seminiferous tubules and germinal elements, a reduction in the number of these cells is manifested as testicular atrophy. The normal fertile adult testis is greater than 4 cm in length and greater than 20 ml in volume. Decreased testicular size, whether unilateral or bilateral, correlates with impaired spermatogenesis. The scrotal contents should be palpated carefully to determine the presence of the epididymis and the vas deferens. Similarly, the spermatic chords should be examined for the presence of varicoceles. Small varicoceles (Grade 1) are palpable only during the Valsalva maneuver. Moderate size varicoceles (Grade 2) are palpated with the patient in the standing position, whereas large varicoceles (Grade 3) are visibile through the scrotal skin and are palpable when the patient is in the standing position.

Initial Basic Laboratory Evaluation

The next step in the evaluation of the male partner in an infertile marriage, after a history and physical examination, is laboratory testing. All patients need a semen analysis. This test remains the cornerstone of the laboratory evaluation of the infertile male. Nevertheless, the measurement of semen parameters does not constitute a measure of fertility. Except in cases of azoospermia, the semen analysis does not allow for the separation of patients into sterile and fertile groups. As semen parameters decrease in quality, the statistical chance of conception decreases but does not reach zero. Minimum levels of adequacy for semen parameters are presented in Table 2. Studies have reported approximately a 25% pregnancy rate in couples whose husbands demonstrated sperm counts of fewer than 12.5 million sperm per ml, whereas 44% of couples conceived when the count was between 12.5 and 25 million sperm per ml.

TABLE 4

CLASSIFICATION OF MALE INFERTILITY STATUS BY CRITERIA OF SEMEN ANALYSIS

I. Absent Ejaculation
   1. Drugs
   2. Surgery
   3. Vascular occlusion
   4. Diabetes mellitus
   5. Psychologic disturbances

II. Azoospermia
   1. Seminiferous tubular sclerosis
      a. Klinefelter's syndrome
      b. Chromatin-negative Klinefelter's syndrome
   2. Germinal aplasia
      a. Idiopathic
      b. Drug/x-ray
      c. Klinefelter's syndrome with mosaicism
      d. XYY syndrome
   3. Maturation arrest
      a. Idiopathic
      b. XYY syndrome
      c. Varicocele
   4. Ductal obstruction
   5. Endocrinopathy

III. Oligospermia
   1. Idiopathic
   2. Cryptorchidism
   3. Varicocele
   4. Drugs
   5. Systemic infection
   6. Endocrinopathy

IV. Normal But Infertile
   1. Gynecologic abnormality
   2. Abnormal coital habits
   3. Acrosomal defects
   4. Immunologic
   5. Unexplained

V. Asthenospermia
   1. Spermatozoal structural defects
   2. Prolonged abstinence
   3. Idiopathic
   4. Genital tract infection
   5. Antisperm antibodies

TABLE 5
ADDITIONAL MALE INFERTILITY LABORATORY TESTS

Antisperm Antibodies
White Blood Cell Staining of Semen
Cultures of the Genital Tract
Testicular Biopsy
Transrectal Ultrasonography
Vasography
Sperm Cervical Mucus Interaction Assays
Acrosome Reaction Assays
Sperm Penetration Assays
Hemizona Assay

Hormonal Evaluation

Approximately 2% of cases of male infertility involve a significant hormone abnormality. Such abnormalities are rare in patients with sperm concentrations greater than 10 million sperm per ml. In the presence of normal spermatogenesis, follicle stimulating hormone (FSH) secretion is regulated by negative feedback by inhibin. With primary testicular failure, inadequate Leydig and Sertoli cell function result in elevated gonadotropin levels with normal or low normal testosterone levels (Table 3). Hypothalamic or pituitary dysfunction resulting in inadequate levels of gonadotropins causes low peripheral levels of testosterone and an absence of spermatogenesis. Patients with sperm densities less than 10 million sperm per ml should have, at a minimum, a screening FSH and testosterone level. Abnormalities in those hormones should prompt an evaluation of all gonadotropins. Prolactin determination should be performed in patients with impaired visual fields, severe headaches, or low gonadotropin levels. Elevated levels of prolactin suggest a prolactin secreting pituitary adenoma.

Interpretation of the Initial Evaluation

Based on the initial evaluation, a differential diagnosis is developed (Table 4). To further define the etiology of the infertility, additional more specific testing may be indicated. The purpose of second level testing is to rule out or rule in specific etiologies (Table 5).

Diagnostic Categories

Based on the results of the above evaluation, the physician should place the patient into an etiologic category. The clinician is then faced with two treatment options. The male patient may be treated in an attempt to improve spermatogenesis and the subsequent chance of conception through intercourse. The alternative management approach is to bypass the problem in the male by using either his spermatozoa with the assisted reproductive techniques or proceeding with donor insemination or adoption. As a general rule, we prefer to treat the male to improve spermatogenesis in those cases in which appropriate treatment is available. On the other hand, often it is not possible to improve spermatogenesis or attempted treatment may fail. In these instances, it is very appropriate to proceed with ART. These two management approaches are not mutually exclusive and in some couples, attempts may be made to treat the male at the same time the couple proceeds with ARTs. The etiologic categories imply a cause for the patientís subfertility, although no cause can be determined for the infertility for a large percent of patients, which places them in the category of idiopathic infertility.

Pretesticular Causes

Pretesticular causes of infertility imply an endocrine basis for the male's infertility. Common conditions in this group include hypogonadotropic hypogonadism in which gonadotropin secretion is below normal resulting in infertility and low testosterone levels. Hormone deficiencies are appropriately treated with hormone replacement therapy, often resulting in a resumption of fertility. Hormone excess, such as with anabolic steroid use or prolactin secreting pituitary adenomas, may also cause infertility.

Testicular Causes

In this group, spermatogenesis is not normal. The patient's hormonal status is not the cause of the patient's infertility and the ductal system functions appropriately. Genetic abnormalities are being identified with increased frequency in this group of patients. Well known syndromes such as Klinefelter's syndrome as well as less common abnormalities such as XYY syndrome, XX male syndrome, androgen abnormalities and microdeletions of the Y chromosome occur in this group of patients. Patients with a history of cryptorchidism, particularly bilateral cryptorchidism, often present with infertility. Varicoceles are well known to be associated with male infertility. It appears that reflux of venous blood through the testicular veins causes an increase in intratesticular temperature resulting in impaired spermatogenesis. Improvement in semen parameters following varicocele repair occurs in approximately 70% of patients; whereas, conception through intercourse occurs in approximately 50% of couples following varicocele repair. Approximately 25% of patients are classified as having idiopathic male infertility in which no etiology for the abnormal semen analysis can be identified. In these patients, treatment options include empiric medical therapy in which hormone stimulation is used to attempt to improve sperm production. Success rates with this approach are no better than 25%. Often, these couples are directed toward the assisted reproductive techniques.

Post Testicular Causes

Obstruction of the genital ducts, including the epididymis, vas deferens, or ejaculatory duct may result in low sperm counts or complete absence of sperm in the seminal fluid. Obstruction may be congenital as in congenital bilateral absence of the vas deferens or acquired, secondary to vasectomy or infection. Treatment for this group of patients involves surgical reconstruction of the ductal system. In some patients, ejaculation does not occur, despite a patent ductal system. In these patients, treatment options include electro-ejaculation or retrieval of sperm combined with the assisted reproductive techniques.

ART

There have been tremendous advances in the ability to use suboptimal semen specimens in attempts to produce conception. Both intrauterine insemination, in vitro fertilization and embryo transfer and in vitro fertilization combined with intracytoplasmic sperm injection are used to treat male factor couples. In appropriate cases, these treatments allow couples a chance at parenthood when previously there was no available therapy. The physician evaluating the infertile male must have a firm grasp of all current treatment options to allow the couple to choose the most appropriate management pathway.

References

1. Sigman M, Howards S. Male Infertility. In Walsh, Retik, Stamey, Vaughan eds. Campbellís Urology. Philadelphia, PA: WB Saunders Company; 1997.
2. Lipshultz LI, Howards SS. Infertility in the Male. 3rd Edition. St. Louis, MI: Mosby Yearbook, Inc.; 1997.
3. Lipshultz LI. Male Infertility. Urologic Clinics of North America. 1994; 21:365-587.
4. Reijo R, Lee TY, Salo P, et al. Diverse spermatogenic defects in humans caused by Y chromosome deletions encompassing a novel RNA-binding protein gene. Nature Genetics. 1995; 10:383-393.

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Ethics of Assisted Reproductive Technologies

Carol A. Wheeler, MD, and Dan Brock, PhD

As new technology enters the field of medicine, health care providers must evaluate each technology not only for its efficacy, but also from an ethical point of view. Reproductive ethics and issues related to the uses of new Assisted Reproductive Technology (ART) bring to light many questions that once were purely speculative but now arise in real patient situations. ART patients invest not only time and money, but make an enormous emotional investment in order to conceive. These patients are vulnerable both to blatant exploitation as well as to more subtle deception.[1] Access to ART services may be limited by factors such as availability, insurance coverage, and patient initiative, instead of by medical need or suitability. The ethical issues raised by ART treatment concern more than just the treated patient or couple. When third parties or third party gametes (such as sperm donation, egg donation, surrogacy) are involved, ART may have broad impacts. Emotional effects on donors and recipients are important considerations. In addition, the potential effects on any children born as the result of these technologies must be examined. Lastly, the impact on soci-

Abbreviations Used:

ART	assisted reproductive technology
ASRM	American Society for Reproductive Medicine
IVF	in vitro fertilization
MFR	multifetal pregnancy reduction
NABER	National Advisory Board on Ethics in Reproduction

ety and even future generations should be considered when techniques such as preimplantation diagnosis are performed.

One of the most challenging moral issues is the nature, scope, and limits of the right to reproduce, and what society must do to guarantee that right. It is well beyond the scope of this paper to examine this issue in depth, but it merits a brief discussion. The right to reproductive freedom concerns control of a woman over her reproduction.[2] It includes a right to prevent reproduction, typically by contraception or abortion, and a right to reproduce, which includes access to ARTs when they are necessary to make reproduction possible. The moral grounds of reproductive freedom are typically taken to rest in the importance of individual self- determination, including control of one's body, the importance of childbearing and child rearing for individuals' well-being and happiness, and the role of reproductive freedom in securing gender equality. In the absence of infertility, the right to control one's own reproduction means that individuals may make decisions about parenthood without unwanted intrusions by others or society. In contrast, when couples choose to adopt, there is scrutiny of their "suitability" to be parents.

There is no consensus among ART providers about who should receive ART services and what psychological/social screening should occur. Different programs vary in their protocols for acceptance of patients based on non-fertility factors. The absence of limits on fertile couples' decisions to procreate suggests a moral presumption that infertile couples should not be subject to such limits. The fact that infertile couples need the collaboration of ART providers may justify some limits by providers on when and to whom they will provide help. Psychological/social screening has considerable potential for discrimination; for example, limitation of services to married heterosexual couples is ethically controversial.

Even among those who agree that the right to reproduce is in part a positive right to necessary assistance in reproduction, there is controversy about the extent of the obligations of others, such as insurers to fund services. Given the importance of the interest in procreating of infertile couples and the fact that infertility meets the usual criterion for disease - a physical condition causing an adverse departure from normal function - a strong case can be made for funding most ARTs in public or private health insurance plans.[3] Resources for health care are, of course, not unlimited and so our society must decide how much to spend on treating infertility, just as it must decide how much to spend on health care more generally.

One of the most challenging moral issues is the nature, scope and limits of the right to reproduce and what society must do to guarantee that right.

Ethical issues arise not only in the actual performance of these techniques, but also in their promotion and advertising. Reporting of statistics without specifying the details can be deceptive. Also, some programs have begun promising "money back guarantees" for couples. These programs offer for a set fee, three cycles of IVF for a select group of patients. If the patient fails to conceive, she receives her money back. If she conceives in the first cycle, she still pays the full fee but the IVF program makes a significant profit. These funding arrangements are controversial - charges for other medical interventions do not depend on their success. Yet from another perspective, this spreads the costs of IVF more evenly over all users of the service. IVF programs may also place limitations on who is eligible for the "money back" program. For example, they may limit it to those couples who are most likely to be successful in IVF (women less than 35, no prior IVF cycles, normal semen parameters, etc.) or require that donor eggs be used in at least one of the cycles, raising the issue of coercion of a couple in order to maximize IVF success.

Ethical principles to be considered when evaluating ART

Virtually the full range of ethical principles and considerations can be relevant to the evaluation of ARTs and their use in practice. We have already discussed briefly what is probably the most important ethical principle, namely respecting individuals' reproductive freedom. This *right to reproductive freedom* can be thought of as establishing a strong moral presumption that individuals should have access to needed and desired ART services.

A second important ethical principle is the *principle of informed consent,* which requires that individuals receiving services should be competent and their decisions informed and voluntary. It will sometimes be controversial whose consent is required. The woman who is attempting to conceive must always consent to all services, and when her partner is participating in the conception process, his consent to his role is required as well. Third party participants, such as semen or egg donors, or surrogates, must consent to their role; ensuring that consent is adequately informed can be notoriously difficult, such as in the case of gestational surrogacy.

A third important ethical principle is the *principle of not causing unjustified harm.* Sometimes harm may be unavoidable and justified by compensating benefits and the consent of the person harmed. It is especially important to be attentive to potential harms to individuals who cannot protect their own interests, such as a potential fetus who may eventually be born.

The fourth important ethical concern is ensuring that services are provided in a manner consistent with *requirements of justice.* One aspect of

justice in ART services is access. ART providers may have limited ability to remedy inequities in access to ARTs; part of their ethical responsibilities in each case may extend beyond care of individual patients to working to secure justice in access to ARTs. A second important aspect of justice concerning ARTs is avoiding exploiting, financially or otherwise, individuals involved in treatment.

In the remainder of this paper, we address some of the existing guidelines for ethical issues in ART, primarily in this country, and then focus on a number of specific areas of ART, looking at some of the ethical issues specific to those procedures.

Professional and legal guidelines

Professional organizations that have issued ethical guidelines and reports regarding ART include the American Medical Association, and the American Society for Reproductive Medicine (ASRM) (formerly the American Fertility Society).[4-5] Various countries, including the United States, have different levels of governmental regulation of ART. Lastly, individual states have requirements for insurance coverage of ART services.

Rhode Island, which is fortunate to have one of the most comprehensive state laws covering ART, requires that insurance plans and policies which provide pregnancy-related benefits also provide coverage for infertility treatment including in vitro fertilization. The law also allows for a maximum copay of 20%, no limit on the number of cycles, but applies only to married couples.

Specific ART services

Donor insemination

Anonymous donor insemination, one of the oldest techniques for treatment of the infertile couple dating back to the 19th century,[6] became widely used in the late 1960's. This technique became much more mainstream when the majority of states created laws establishing the husband of the inseminated woman as the father of the child. The main concern has been the use of a 3rd party in the process of creating a pregnancy, but with the use of mostly anonymous donor sperm little controversy has arisen. The medical risks to the woman, though present, are relatively minimal. The risks to the sperm donor are minimal. The psychological effects on the child or couple are still not completely understood. Provided adequate counseling and consent are obtained from all involved parties, the process of donor insemination is generally well accepted from an ethical standpoint.

In Vitro Fertilization (IVF)

Standard in vitro fertilization, for the purpose of conception in couples where all other fertility treatments have failed, utilizes the sperm and egg of the infertile couple. Objections to standard IVF include the fact that this separates conception from sexual union (an objection voiced primarily by certain religious groups), and the possibility of increased congenital malformations (not borne out by experience). The risks to the couple are discussed by the treating program before obtaining consent. There appear to be no increased medical or psychological risk to the offspring. In general, most people consider IVF ethically acceptable.

Cryopreservation

Freezing of spermatozoa has been successfully performed since the 1950's. Only recently has the successful freezing of eggs been accomplished.[7] Egg freezing is not yet available outside research. For the present time, the focus has been on the cryopreservation of human pre-embryos. Pre-embryo cryopreservation offers several advantages for the couple undergoing ART. When initially used in ART programs, it allowed programs to fertilize a large number of eggs and select the healthiest pre-embryos for transfer. The remaining pre-embryos could then be frozen without concern about discarding them. The other advantage was the opportunity to thaw the pre-embryos for use in a later cycle without the need for repeated drug treatment, egg retrieval and fertilization. Regrettably, many embryos fail to be viable post thaw, and the pregnancy rates for frozen and thawed pre-embryos are disappointingly low.

A large number of children have now been born from these cryopreserved pre-embryos, with no evidence of any increased risk to the offspring. A major ethical area of concern, especially to those who consider the embryo a human person, is the ultimate disposition of these pre-embryos. Most ART programs stipulate in the initial consent plans for the ultimate disposition of the embryos, but it is not clear if these are legally binding. There are four options: extended cryopreservation (forever), thawing of pre-embryos with disposal, research, or donation to another individual. Many different scenarios have arisen. For example, if the male partner dies, does the woman have the right to have the embryos transferred? What if both partners die? Are the embryos legal heirs to the estate? What about in case of divorce? Are the embryos property? These issues are still being addressed in the courts and elsewhere without a clear consensus.

Many programs now have to deal with a large number of cryopreserved embryos whose parents are no longer able to be located. To whom do these embryos belong? How long can or must these embryos remain frozen? We do not know the technological limits to cryopreservation, but many programs have placed limits on it to avoid the ethical issues related to indefinite storage.

Micromanipulation

These are procedures used to assist in fertilization or implantation (see elsewhere in this issue). They have become increasingly successful and the frequency of their use has exploded. Initial concerns regarding risk to the egg and embryo have been unsubstantiated as experience has accumulated. Risk to the offspring does not appear to be increased based on initial studies of children born after these techniques. One question remains about the ultimate reproductive capacities of these children when they reach adulthood, since many have been conceived from fathers who otherwise would have been infertile and may have a genetic defect in their sperm. In general, the use of these techniques in medically indicated situations seems ethically acceptable.

Donor eggs

The use of donor eggs offers women without healthy or viable oocytes the opportunity to carry a pregnancy. Many young women with genetically nonfunctional or surgically absent ovaries are One of the most hotly discussed ethical issues of recent note in the area of ART is the use of donor oocytes in postmenopausal women. It has been shown that women as old as 63 can gestate a pregnancy provided adequate hormonal support is given.[8] Since these women are potential parents of young children late in life, the ultimate impact on the lives of the offspring is unknown. In addition, the risk from pregnancy in older women is potentially much greater. However, arguments have been made that men become parents late in life without ethical concern. Why shouldn't the same standards be applied to women?

Donor embryos

Excess embryos, generally frozen but possibly fresh, may be considered for possible transfer into women in place of donor eggs. The offspring bears no genetic similarity to either parent, and is essentially an adopted gestation. This area is still quite controversial since adoption is a solution to an unfortunate situation, but the goal of embryo donation is to accommodate the infertile woman who wishes to carry a child. Some would say that until all children who are waiting for adoptive parents are placed, embryo "adoption" should be a low priority. Legislation is still limited in specifying rearing rights and custody issues, but as the practice slowly increases this will have to be clarified.

Surrogates

Surrogate pregnancies can occur as gestational (gametes from an infertile couple transferred to genetically unrelated surrogate) or full (traditional - egg from surrogate, sperm from the partner of the infertile woman). Women who have congenital or surgical absence of the uterus are potential surrogate candidates. This surrogate may be either known or anonymous. Programs with surrogate programs must carefully counsel the surrogate since she is exposing herself to the medical and emotional risks of pregnancy and of giving up her infant at birth. No one can predict the effects of intrauterine bonding on both the infant and mother. When the surrogate is paid, concerns about exploitation are important. The legal enforceability of surrogacy contracts is problematic. Pregnancy "brokers" can extract enormous fees from infertile couples for arranging these relationships. Lastly, there are questions about women who contract with a surrogate for social, not medical reasons (such as the desire not to have to deal with a pregnancy). These cases need continued public and professional discussion at groups such as hospital bioethics committees.

Multifetal pregnancy reduction (MFR)

Multifetal pregnancy reduction or selective reduction is the process by which one or more fetuses are injected with a substance which leads to fetal loss in order to potentially allow the successful gestation of the remaining fetuses. Most commonly this involves the reduction from triplets or quadruplets to twins. This difficult decision evokes emotional and moral issues regarding pregnancy termination, which is particularly difficult in a highly desired pregnancy. When faced with the medical aspects of delivery of triplets or more at a very premature state versus the more likely healthy outcomes for singletons or twins, many couples decide on MFR, particularly in the case of quadruplets.

Conclusion

Each area of ART brings a new group of issues for ethical consideration. We must continue to examine, discuss, and debate these issues as we develop new options in infertility treatment. Ethics Committees can monitor programs for evidence of exploitation or deception. On a national level, guidance from professional groups such as National Advisory Board on Ethics in Reproduction (NABER) and the ASRM ethics committee will give practitioners a starting point for these deliberations.

References

1. Joint Report of the Council on Ethical and Judicial Affairs and Council on Scientific Affairs of the AMA. CEJA/CSA Report-A-96; 1996:1-4.
2. *Health Care Ethics: Critical Issues for Health Professionals.* eds. Thomasma D, John Monagle J. Gaithersburg, MD: Aspen Publishers, 1994.
3. Brock, DW. Funding new reproductive technologies: Should they be included in basic benefits packages? in *New Ways of Making Babies: The Case of Egg Donation.* ed. Cohen C. Bloomington IN: Indiana University Press, 1996.
4. AMA Code of Medical Ethics. American Medical Association. 1997;27-9.
5. American Fertility Society, Ethical statement on in vitro fertilization. *Fertil Steril* 1984;41:12.
6. American Fertility Society, Ethical considerations of the new reproductive technologies. *Fertil Steril* 1990;53:43.
7. Tucker M, Wright G, Morton P, et al. Preliminary experience with human oocyte cryopreservation using 1,2-propanediol and sucrose. *Hum Reprod* 1996;11:1513-1515.
8. Paulson RJ, Thornton MH, Francis MM, Salvador HS. Successful pregnancy in a 63-year-old woman. *Fertil Steril* 1997;67:949-51.

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THE CREATIVE CLINICIAN:
CASE OF THE MONTH

The practice of medicine is an art, not a trade; a calling, not a business ..." – WILLIAM OSLER, Aequanimitas

Editor: Anthony Mega, MD; Co-editor: Fred J. Schiffman, MD

Sepsis and the Pulmonary Artery Catheter

Nidal Yunis, MD, and Robert S. Crausman, MD, MMS

Sepsis and sepsis syndrome are a common cause of morbidity and mortality in hospitalized patients. In recent years much has been learned about the basic underlying pathophysiology; but there is little beyond the use of antibiotics, fluid hydration and supportive management available to treat this condition. In 1970 when the first commercially available flow directed right heart catheters became available, they were used in the management of patients with sepsis.[1] Although rigorous scientific investigation has not shown a benefit, Pulmonary Artery (PA) catheters gained widespread clinical acceptance. We present a patient with possible sepsis on clinical grounds and discuss whether a PA catheter would help him and similar patients.

Case Presentation

A 65 year old white man, with a past medical history of alcohol abuse, COPD, and likely laryngeal cancer (for which he refused any work-up or treatment), presented with acute dyspnea and fever, without any other respiratory or cardiac symptoms. His medications were theophyllin, albuterol, and ipratropium bromide. He had a history of heavy smoking and alcohol abuse. In the emergency department, the patient was found to be in acute respiratory distress, with a BP 88/50, HR 124, RR 34, temperature of 102.4%F, and oxygen saturation of 84% on room air. Lung exam revealed moderate air movement bilaterally, with mild expiratory wheezes, and no rales. The rest of the physical exam was unremarkable. His laboratory showed normal electrolytes, BUN, and creatinine; his CBC was only noteworthy for increased WBC (10.7K, predominantly neutrophils). Arterial blood gas done on 100% face mask revealed pH 7.25, PCO_2 55 Torr, PO_2 233 Torr. CXR was significant for hyperinflation without infiltrates and ECG showed sinus tachycardia. Blood cultures (x2) were obtained as well as urine cultures.

Soon after arrival to the emergency department, the patient's respiratory status deteriorated. His blood pressure continued to drop despite aggressive intravenous fluid resuscitation. He was intubated emergently; mechanical ventilation was instituted; and intravenous dopamine was started to support his blood pressure.

The patient was transferred to the intensive care unit, where broad-spectrum antibiotic coverage was initiated. He continued to require dopamine and normal saline infusion to maintain a blood pressure of 86-90/40-50 overnight. A pulmonary artery (Swan-Ganz) catheter was inserted to evaluate volume status, hemodynamic parameters, and to guide fluid and inotroph therapy. The initial hemodynamics revealed increased cardiac index, and a low systemic vascular resistance with normal pulmonary capillary wedge pressure.

Discussion

This case presents the common clinical question: When should a PA catheter be used in the diagnosis and management of sepsis?

In 1996 Connors et. al.[2] published results from the SUPPORT (Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments) trial, a multi-center prospective cohort study, involving 5,735 critically ill adult patients to assess, among other things the effectiveness of right heart catheterization in the initial care of critically ill patients.[2] The endpoints included the 30 day mortality, length of ICU stay and the mean cost per hospital stay per patient. The overall mortality of patients who received right heart catheterization in this study was increased compared with those who did not (RR 1.24 95% C.I. 1.03-1.49), the mean length of stay in the ICU was increased (14.8 vs. 13.0 days $p < 0.001$) and the total cost was increased ($49,300 vs.$35,700 $p < 0.001$). Subgroup analysis affirmed these findings across nearly all categories, including sepsis and multisystems organ failure. Chronic heart failure was the only diagnosis not to show this relationship with increased mortality. Dalin and Bone,[3] in an accompanying editorial, urged the National Heart, Lung and Blood Institute to undertake a multicenter randomized controlled clinical trial to study the use of the right heart catheter in critically ill patients. They recommended that without such a randomized controlled trial, the FDA should consider a moratorium on the use of the flow directed pulmonary artery catheter. The Connors study has been criticized on several grounds: First, it was not a randomized controlled trial but rather an observational study. Second, it relied upon a complicated case matching system and the derivation of a propensity score as an assessment of severity of illness to adjust

for important covariates - criticisms raised by the authors themselves.[2] However, the well-done study raises an important question: "Do PA catheters as used in clinical practice improve outcomes?"

First, the PA catheter is a potentially useful tool to diagnose sepsis. Patients with sepsis often have a characteristic hemodynamic profile that includes a moderate to high cardiac output and a low systemic vascular resistance.[4-7] Furthermore, approximately 50% of patients with sepsis suffer an element of myocardial depression with a reduced ejection fraction.[8,9] This characteristic profile, however, is not unique to sepsis and can be seen in patients with liver failure, toxemia of pregnancy, anaphylaxis, arteriovenous fistulae, or the use of vasodilators. Also, patients with sepsis and co-existing heart disease may not show the expected elevation in cardiac output. Finally, in clinical practice the PA catheter often provides ambiguous data with considerable interobserver variability in interpretation.[10]

In 1983, Connors et. al.[11] evaluated the PA catheter to determine whether it enhanced clinical assessment. This prospective study of 56 patients who had been assessed with a complete physical examination and chest x-ray demonstrated that 30/62 (48%) had findings on PA catheter that led to a change in treatment. Here, the Pulmonary Capillary Wedge Pressure (PCWP; low, normal, high or very high) was predicted correctly in only 42% of patients; the cardiac index was predicted correctly in only 44%. Only 18/29 (63%) with suspected sepsis on clinical grounds had confirmatory PA catheter findings - a 37% false positive rate for clinical assessment. Thus, the use of a PA catheter does affect clinical assessment and clinical decision making. To what end, however, is unclear.

Although widely accepted as a useful tool for the treatment of patients with sepsis, a candid review shows that the widespread use of this catheter is not clearly associated with improved outcomes.

Second, the PA catheter can potentially provide prognostic information regarding sepsis. Those patients exhibiting a lower systemic vascular resistance may exhibit a higher mortality.[7] This has not, however, been confirmed prospectively. More recently, Valet et. al.[1,2] performed a prospective study with a Dobutamine infusion and volume loading to assess whether hemodynamic responses could predict survival. In this study 23/50 responded, defined as a greater that 15% increase in oxygen utilization (VO_2) and demonstrated a markedly improved mortality (8.7% vs. 44%). Still, this result is of limited value in the treatment of individual patients.

Third, the PA catheter may be a cause of sepsis. The incidence of sepsis described with use of the catheter is thought to increase with the number of manipulations, with prolonged duration of use, and maybe a function of the site of catheterization. This incidence decreases with the use of a protective sleeve. In a recent prospective study of PA catheter complications in 500 consecutive patients cared for in an academic medical center,[13] the combined incidence of sepsis, endocarditis and positive blood cultures totalled less than 2%.

Finally, strong clinical arguments for the use of the PA catheter have been made for its role in the treatment of sepsis. The PA catheter finds use commonly in guiding fluid resuscitation and in guiding catecholamine inotroph and vasopressor use. Several small studies have demonstrated that volume expansion of patients with a low PCWP can improve the intermediate endpoints of blood pressure, cardiac output, and urine output. However, no improvements in endpoints such as mortality have been demonstrated.[14,15,16] Small, generally uncontrolled prospective studies have shown encouraging results to support the role of the PA catheter in guiding catecholamine use. In one trial, Edwards[17] performed a prospective study in 29 patients with septic shock. Patients received volume expansion and catecholamine drips with the aim to increase the cardiac output and oxygen delivery (greater that 4.5 liters/minute/m^2, greater than 600ml/min m^2). The mortality in this study was 52% which, according to the authors, was markedly improved compared to historic controls. In a randomized controlled trial of 51 patients to receive either normal treatment aiming for a cardiac index of 3 liters/minutes/m^2 or optimal treatment aiming for a cardiac index of 6 liters/minute/m^2, the mortality for the normal treatment group was 72% vs. 50% in the optimal treatment group.[18] However, this difference was significant only to a p value of 0.14. Several large randomized controlled trials that include septic patients have been conducted to assess the value of achieving supranormal oxygen delivery upon clinical outcomes (Yu, Hayes and Gattinoni[19,20,21]). Two of these (Yu and Gattinoni[19,21]) demonstrated no benefit in mortality; one (Hayes[20]) showed worsened survival (34% vs. 54%) - adding to the controversy surrounding the use of the PA catheter.

Although widely accepted as a useful tool for the treatment of patients with sepsis, a candid review shows that the widespread use of this catheter is not clearly associated with an improved outcomes. The PA catheter can be useful in making the diagnosis of sepsis and may even be useful for defining certain subgroups with a particularly poor prognosis. But limited data support its use in directing fluid resuscitation to improve morbidity and mortality. Further, its role in guiding inotroph and vasopressor therapy is similarly undersupported. Thus, until these questions are more fully explored, we as clinicians must reflect upon our own use and experiences with the PA catheter and, as so often is the case in clinical medicine, rely on an incomplete data base to guide us as we care for our patients.

References:

1. Swan HJC, Ganz W, Forrester J, et al. Catheterization of the heart in man with use of a flow-directed balloon-tipped catheter. *N Engl J Med* 1970; 283: 447-451
2. Connors AF, et al: The Effectiveness of Right Heart Catheterization in the Initial care of Critically Ill Patients. *JAMA* 1996; 276: 889-897
3. Dalen JE, Bone RC. Is It Time to Pull the Pulmonary Artery Catheter? *JAMA* 1996; 276: 916-918
4. Motsay GJ, Dietzman RH, Ersek RA, Lillehei RC. Hemodynamic alterations and results of treatment in patients with gram-negative septic shock. *Surgery* 1970; 67: 577-583
5. Winslow EJ, Loeb HS, Rahimtoola SH, et al. Hemodynamic Studies and Results of Therapy in 50 Patients with Bacteremic Shock. *Amer J Med* 1973; 54: 421-432
6. Shoemaker WC. Cardiorespiratory Patterns in Complicated and Uncomplicated Septic Shock: Physiologic Alterations and Their Therapeutic Implications. *Ann Surg* 1971;174:119-125
7. Groeneveld ABJ, Bronsveld W, Thijs LG. Hemodynamic determinants of mortality in human septic shock. *Surgery* 1985; 99: 140-153
8. Weisel RD, et al: Myocardial Depression during Sepsis. *Amer J Surgery* 1977; 133: 512-521
9. Parker MM, et al. Profound but Reversible Myocardial Depression in Patients with Septic Shock. *Annals of Internal Med* 1984;100:483-490
10. Komadina KH, et al. Interobserver Variability in the Interpretation of Pulmonary Artery Catheter Pressure Tracings. *Chest* 1991;1006:1647-1654
11. Connors AF, McCaffree DR, Gray BA. Evaluation of Right-Heart Catheterization In the Critically Ill Patient Without Acute Myocardial Infarction. *N Eng J Med* 1983; 308: 263-267
12. Edwards JDE. Predicting outcome from sepsis. *Critical Care Med* 1993; 21:1819-1820
13. Boyd KD, et al: A Prospective Study of Complications of Pulmonary Artery Catheterizations in 500 Consecutive Patients. *Chest* 1983; 84:245-249
14. Krausz MM, et al: Cardiopulmonary Effects of Volume Loading in Patients in Septic Shock. *Ann Surg* 1977; 185: 429-434
15. Rackow EC, et al: Hemodynamic Response to Fluid Repletion in Patients With Septic Shock: Evidence for Early Depression of Cardiac Performance. *Circulatory Shock* 1987;22:11-22
16. Packman MI, Rackow EC: Optimum left heart filling pressure during fluid resuscitation of patients with hypovolemic and septic shock. *Critical Care Med* 1983:11:165-169
17. Edwards JD, et al: Use of Survivors' cardiorespiratory valves as therapeutic goals in septic shock. *Critical Care Med* 1989:17:1098-1103
18. Tuchschmidt J, et al: Elevation of cardiac Output and Oxygen Delivery Improves Outcome In Septic Shock. *Chest* 1992;102:216-220
19. Gattinoni L, et al: A Trial of Goal-Oriented Hemodynamic Therapy in Critically Ill Patients. *N Engl J Med* 1995; 333:1025-1075
20. Hayes TM, et al. Elevation of systemic oxygen delivery in the treatment of critically ill patients. *N Engl J Med* 1994;330:1717-1722
21. Yu M, et al: Effect of maximizing oxygen delivery on morbidity and mortality rates in critically ill patients: A prospective, randomized, controlled study. *Crit Care Med* 1993; 21: 830-838.

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Health by Numbers

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by Jay S. Buechner, PhD, and William J. Waters, Jr., PhD

Medical Services at the Worksite

Jay S. Buechner, PhD, and Megan Werner, AB

Some Rhode Island employers provide medical services, such as physician services and nurse services, for the employees at their worksites. In September 1995, the Rhode Island Department of Health surveyed a representative sample of employers in the state with 10 or more employees concerning their worksite wellness programs and activities.[1] Included in the survey were questions concerning the provision of on-site medical care by physicians or nurses for employees. This information was collected by the Department because of the potential for medical personnel at worksites to guide worksite wellness programs and to provide clinical preventive services, such as adult immunizations and screening tests for selected chronic diseases, to workers.

Methods

Survey data were collected through two mailings of a questionnaire to a sample of 1,062 Rhode Island employers, selected from employers registered with the Rhode Island Department of Employment and Training (now Department of Labor and Training) as of July 1, 1995. The sample included employers with 10 or more employees and was stratified by four employee size groups. A total of 739 employers returned usable responses, for a response rate of 70%. The methodology closely followed that of a similar survey performed in 1981, except that the earlier survey was limited to employers with 20 or more employees.[2] Results from the 1981 survey have been recalculated to adjust for sample stratification and thereby be comparable to the results from the 1995 survey.

Results

In 1995, approximately 8% of employers with 10 or more employees, or one in twelve, provide full-time or part-time physician and/or nurse services for employees at their worksites. (Figure 1) The likelihood of providing such services rose markedly with the size of the company, so that the largest employers, those with 100 or more employees, were ten times as likely to offer such services as the smallest employers. Nevertheless, nearly three-quarters of the largest employers did not offer any such services on-site. The likelihood of offering on-site medical services was also greater among companies who report having an organized worksite wellness program: 22.2% of employers with such programs offered on-site medical care, compared to 5.6% of employers without wellness programs.

Among employers who provided on-site medical services, the type of medical professionals hired to provide these services varied. The most common choice was to provide both physician and nurse services on-site (38%), followed closely by nurse services only (37%), with approximately one-quarter providing only physician services on-site. (Figure 2) Among all employers, slightly more (6.0%) provided nurse services to their employees than provide physician services (5.1%). Employers were more likely to hire part-time physicians (3.0% of all employers) than full-time physicians (2.0% of all employers) and, conversely, more likely to hire nurses full-time (4.3% of all employers) than part-time (1.7% of all employers).

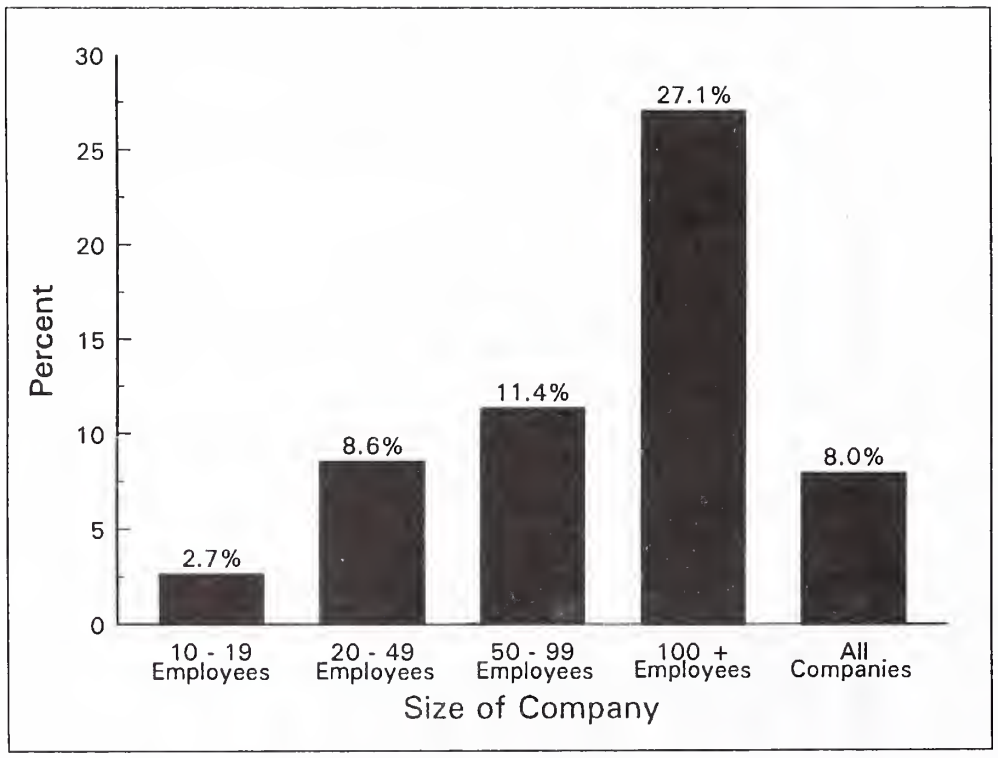

Figure 1. Percentage of Employers with On-Site Medical Services, by Size of Company, Rhode Island, 1995.

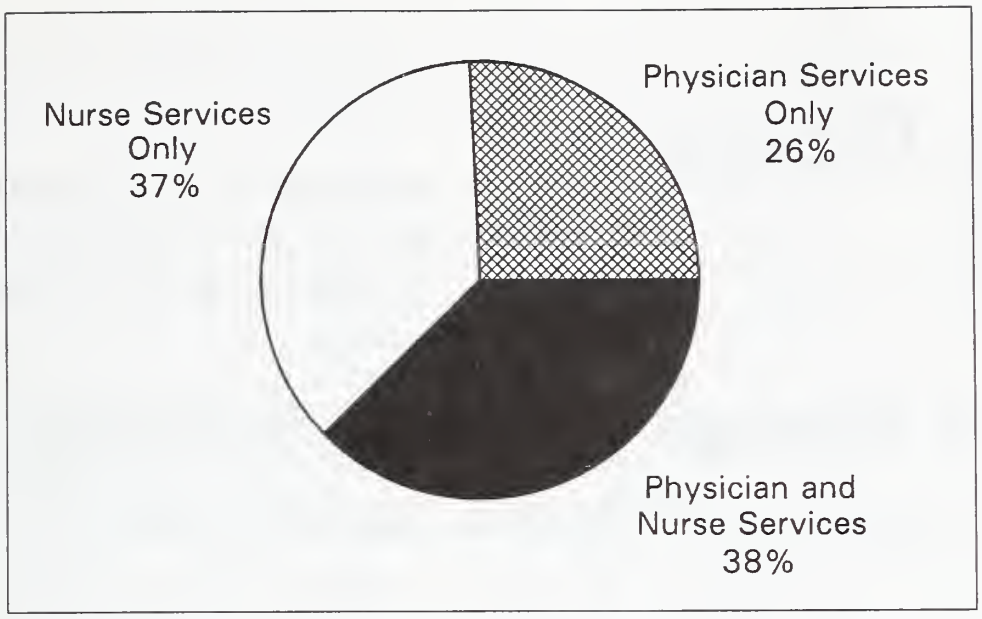

Figure 2. Medical Professionals Providing Care at Worksites with On-Site Medical Services, Rhode Island, 1995.

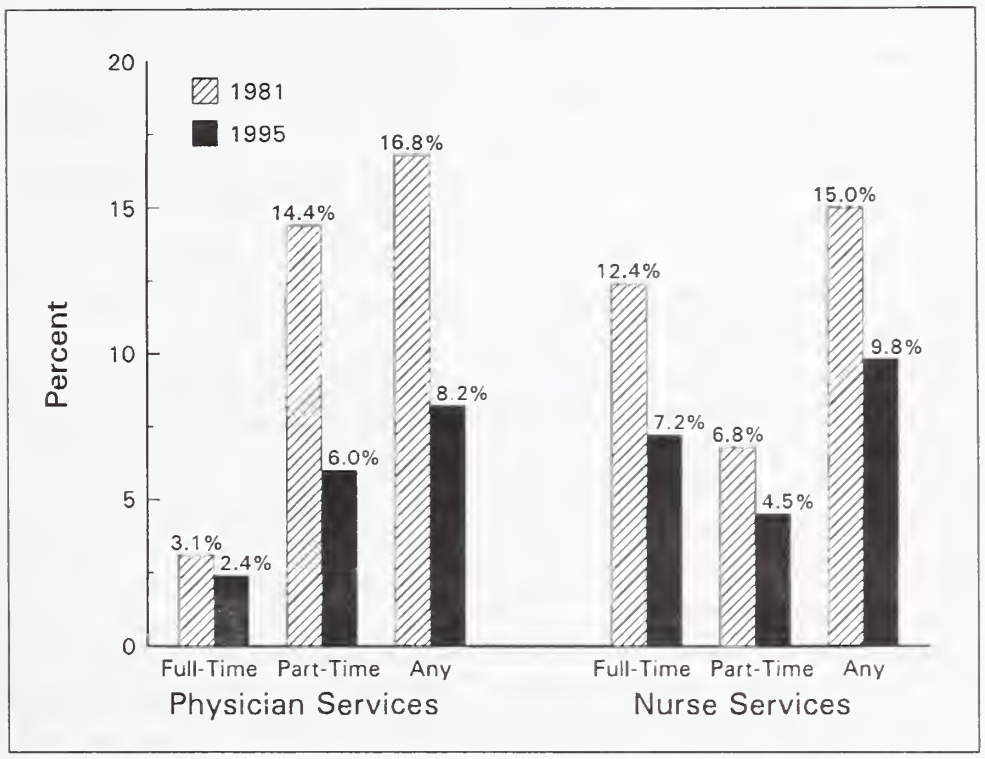

Figure 3. Percentage of Employers with On-Site Medical Services, by Type of Provider and Employment Status, Rhode Island, 1981 and 1995.
(Note: Includes employers with 20 or more employees only.)

Over time, the proportion of employers who provided on-site medical services decreased. (Figure 3) In 1981 more than twice as many employers offered physician services on-site (16.8% of employers with 20 or more employees) than did so in 1995 (8.2%). There was also a substantial decrease in the number providing nurse services on-site, from 15% in 1981 to just under 10% in 1995. The declines were in both full-time and part-time medical staff.

Discussion

The survey data do not address the reasons for the decline in the proportion of employers providing on-site medical care over the period between the two surveys. However, it is apparent that companies without on-site medical personnel are less likely to have worksite wellness programs. To encourage the development of worksite wellness programs, the Department of Health needs to identify other sources of knowledge and staffing within companies, particularly in the human resources area, that can be used to promote programs of this nature. Other potential partners in fostering worksite wellness include health insurers and occupational medicine providers, who may contract with their customers to provide worksite wellness services.

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References

1. Werner M and Buechner JS. *Worksite Wellness in Rhode Island: Results of the 1995 Worksite Wellness Survey.* Providence, RI: Rhode Island Department of Health (October 1997).
2. Kelley BC, Gute DM, Potthoff PP, Waters WJ. Health promotion activities at the worksite: a Rhode Island business perspective. *Rhode Island Medical Journal* 1984;67:395-398.

PUBLIC HEALTH BRIEFING

Rhode Island Department of Health
Patricia A. Nolan, MD, MPH, Director of Health

Edited by John P. Fulton, PhD

A Novel Approach to Diabetes Screening

Joann M. Lindenmayer, DVM, MPH, and Dona Goldman, RN, MPH

Introduction

The Diabetes Control Program of the Rhode Island Department of Health was recently presented with an unusual and exciting funding opportunity. A Rhode Island philanthropist with first-hand understanding of how important it is to identify diabetes early in the course of the disease has pledged to raise and donate more than a million dollars to identify at least 500 Rhode Islanders who have diabetes but are unaware of it. To achieve this objective, the American Diabetes Association-Rhode Island Affiliate (ADA-RI), which specializes in educating the public about diabetes, has entered into a partnership with the Rhode Island Department of Health (RIDOH), long a force in community-based diabetes control programs.

Background

Diabetes is a problem of major public health importance in Rhode Island. Among the estimated 70,000 Rhode Islanders with diabetes, more than 90% have non-insulin dependent diabetes mellitus (NIDDM). Roughly a third of all people with NIDDM are not aware that they have the disease. Persons with diabetes, particularly those who remain undiagnosed and untreated, are at risk for serious long-term complications and disability. Diabetic microvascular complications are a major cause of visual impairment and blindness, and kidney failure. Macrovascular complications associated with diabetes include cerebro-, cardio-, and peripheral vascular disease leading to lower extremity amputations. The direct medical costs associated with these complications are great, and indirect costs (i.e., loss of productivity) are likewise substantial. The costs of caring for people with diabetes accounts for approximately 15% of all health care expenditures.[1]

The burden of diabetes is considerably higher among minority populations than non-minority populations, and higher among older people than younger people.[2,3,4] Rhode Island has one of the fastest growing minority populations and the third oldest population in the United States. For these reasons, the burden of morbidity, mortality, loss of quality of life, and the costs associated with diabetes are of particular importance in this state.

Results of the Diabetes Control and Complications Trials (DCCT)[5,6] demonstrated that micro- and macrovascular complications of insulin dependent diabetes (IDDM) can be delayed, and in some cases prevented entirely, with strict control of blood glucose concentrations. Similar trials in persons with NIDDM are pending, but there are many reasons to believe that glycemic control in persons with NIDDM will be equally beneficial. Furthermore, glycemic control in persons with NIDDM is best achieved first with lifestyle changes (dietary control, weight loss, and regular exercise) followed by use of oral hypoglycemic agents or insulin. It may be possible, then, to achieve glycemic control in persons with NIDDM with less costly interventions.

The burden of diabetes and the effectiveness of secondary prevention provide two good reasons to support the development and application of screening tests for the early identification of diabetes. The ADA recommends that persons 45 years of age and over be screened for diabetes every three years with two fasting plasma glucose (FPG) tests.[7] However, surveys indicate that many Rhode Island physicians do not routinely screen their patients for diabetes. Furthermore, people at elevated risk for diabetes are more likely than others to be under- or uninsured, making it even less likely that they will be screened.

Abbreviations Used:

ADA-RI	American Diabetes Association-Rhode Island Affiliate
BRFSS	Behavioral Risk Factor Surveillance System
DCCT	Diabetes Control and Complications Trials
DCP	Diabetes Control Program
DOE	Diabetes Outpatient Educators
FPG	fasting plasma glucose
IDDM	insulin dependent diabetes
NIDDM	non-insulin dependent diabetes mellitus
RIDOH	Rhode Island Department of Health

Two screening tests currently available to the public for self-testing are urine glucose test strips and a recently revised diabetes risk questionnaire.[8,9] In addition to their availability, these tests are inexpensive, easy to perform, their results are available in a timely fashion, and they are sufficiently sensitive and specific to distinguish between persons with diabetes and those without diabetes. Compared to World Health Organization standards for diabetes diagnosis, the sensitivity of a single postprandial urine test was 43%, the specificity was 98%, and the positive predictive value was 53%.[7] Compared to a standard risk questionnaire, the sensitivity of the revised risk questionnaire was 79% and the specificity was 65%.[9] These tests appear suitable for application in a broader context than the FPG test and they hold promise for the identification of a large number of people with diabetes, but their acceptability by a population has not been tested.

Project Description

This project will test the acceptability, effectiveness, and cost-effectiveness of urine test strips, a diabetes risk questionnaire, and invitations to receive fasting plasma glucose tests for the identification of persons with undiagnosed diabetes in the Rhode Island population. Beginning in March, 1998, all households in RI will be randomly assigned to receive one of the following in the mail:

- urine test strips and instructions for use,
- diabetes risk questionnaires and instructions for completion, or
- invitations for free FPG tests.

People must be at least 45 years of age to be eligible to participate. Each mailing will be accompanied by ADA-RIDOH-developed diabetes educational materials. Eligible participants will be asked to take the assigned test or respond to the FPG invitation and send the results or response to the RIDOH. People who have tested positive by a screening test or who have accepted the invitation for a FPG test will be scheduled for a FPG appointment at one of many FPG testing sites set up around the state. This "direct effect" of the Screening Project will be monitored carefully. Many people may call their physicians directly about FPG testing, with or without taking a screening test. This "indirect effect" of the Screening Project will be monitored as well.

In keeping with ADA screening guidelines, persons who test positive by the first FPG test will be scheduled for a second FPG. People with newly identified diabetes who have neither health insurance nor a personal physician will be given the opportunity to be linked to primary care providers through Diabetes Resource Centers throughout the state. These centers also provide diabetes education, free diabetes medication, and access to care and counseling. People who have a regular source of health care will have education, nutrition, and diabetes supplies provided by a new state law that mandates third party coverage for these items. Approximately 102 certified Diabetes Outpatient Educators (DOE) will provide education to persons with diabetes, regardless of whether they are insured or uninsured.

The project will be accompanied by a carefully designed media campaign that will make extensive use of social marketing tools and techniques, such that the potential participants will be reached within their communities, by their community organizations. The Diabetes Control Program (DCP) at the RIDOH has, over the years, developed extensive expertise with the development of culturally sensitive diabetes educational materials in English and in Spanish. The DCP has worked in partnership with many community groups who have promoted diabetes control.

Baseline measures reflecting the population's understanding of

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diabetes risk factors, outcomes, and means of prevention will be collected prior to the Screening Project using the 1997 RI Behavioral Risk Factor Surveillance System (BRFSS) statewide telephone survey. Results will guide the social marketing efforts of the project. Then, in 1998 the survey will be repeated to evaluate the effectiveness of the educational intervention.

Anticipated Outcomes

Based on assumptions about population size, screening test acceptability, and screening test performance, the following outcomes are anticipated:

- 285,750 people 45 years of age and over will receive general diabetes information in the mail, from participation in community-based organizations, and from the media.
- Approximately 80,000 people 45 years of age and over will take either a urine test or complete a diabetes risk questionnaire in the comfort of their homes.
- Each of the 1,305 primary care physicians in the state can expect to test, on average, 14 additional persons by FPG, and to add, on average, 1.4 new patients to their patient population, over the 12 months of this project.

Work In Progress

An Advisory Committee has been established and charged with oversight and coordination of the technical, medical, legal, educational, and marketing aspects of the Statewide Diabetes Screening Project. The committee includes representatives from state government, academic institutions, private voluntary organizations, the business community, local and minority communities, the medical community, and private citizens.

In an era when public health resources are increasingly constrained, this project represents an exciting partnership between public and private sectors in the interests of protecting and improving the health of the public.

For more information about the Statewide Diabetes Screening Project, please contact Ms. Dona Goldman (277-1394,x 128) or Dr. Joann Lindenmayer (277-2588 ,x 114) at the Rhode Island Department of Health.

If you have patients with diabetes who are un- or underinsured, and would like more information about the supplies and services offered at Diabetes Resource Centers, please call Ms. Kathy Monteith at St. Joseph Hospital for Specialty Care at 456-4419.

References

1. Rubin RJ, Altman WM, Mendelson DN. Health care expenses for people with diabetes mellitus. 1992. *J Clin Endocrinol and Metabolism* 1994; 78:809A-F.
2. Harris MI. Epidemiological correlates of NIDDM in Hispanics, white, and blacks in the U.S. population. *Diabetes Care* 1991;14:639-48.
3. Johnson AE, Taylor AK. Prevalence of chronic diseases: A summary of data from the survey of American Indians and Alaska natives. *National Medical Expenditure Survey Data Summary 3,* Agency for Health Care Policy and Research, Rockville, MD, AHCPR publ. no. 91-0031, 1991.
4. Gohdes D. Diabetes in North American Indians and Alaska natives. In: *Diabetes in America.* 2nd ed. Harris MI, Ed. National Institute of Health 1995, p. 683-701 (NIH publ. no. 95-1468).
5. Reichard P, Nelsson BY, Rosenqvist U. The effect of long-term intensified insulin treatment on the development of microvascular complications of diabetes mellitus. *N Engl J Med* 1993; 329;304-9.
6. The Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993;329:977-86.
7. Eastman RC, Vinicor F. Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care* 1997;20:1183-97.
8. Davies MJ, Williams DRR, Metcalfe J, Day JL. Community screening for non-insulin -dependent diabetes mellitus: self-testing for post-prandial glycosuria. *Quarterly J of Med* 1993; 86:677-684.
9. Herman WH, Smith PJ, Thompson TJ et al. Take the test: know the score. A new questionnaire to identify persons at increased risk for undiagnosed diabetes mellitus. *Diabetes Care* 1995;18:382-7.

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Dona Goldman, RN,MPH, is Director, Diabetes Control Program, RI Department of Health.

Vital Statistics

Rhode Island Department of Health

Patricia A. Nolan, MD, MPH, Director of Health

Edited by Roberta A. Chevoya

Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

Vital Events

	Reporting Period		
	June 1997	12 Months Ending with June 1997	
	Number	Number	Rates
Live Births	1,176	13,515	13.6*
Deaths	742	10,025	10.1*
Infant Deaths	(8)	(88)	6.5#
Neonatal deaths	(6)	(69)	5.1#
Marriages	969	8,198	8.3*
Divorces	219	3,096	3.1*
Induced Terminations	456	5,636	417.0#
Spontaneous Fetal Deaths	94	1,028	76.1#
Under 20 weeks gestation	(91)	(942)	69.7#
20+ weeks gestation	(3)	(86)	6.4#

* Rates per 1,000 estimated population
\# Rates per 1,000 live births

Underlying Cause of Death

	Reporting Period			
	December 1996	12 Months Ending with December 1996		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	354	3,320	335.3	4,353.0
Malignant Neoplasms	217	2,544	256.9	7,185.0
Cerebrovascular Diseases	81	597	60.3	876.5
Injuries (Accident/Suicide/Homicide)	33	325	32.8	5,692.0**
COPD	58	408	41.2	222.5

** Excludes 1 death of unknown age

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 990,225
(c) Years of Potential Life Lost (YPLL)

Note: Totals represent vital events which occurred in Rhode Island for the reporting periods listed above. Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

Philately in Medicine

John Tierney

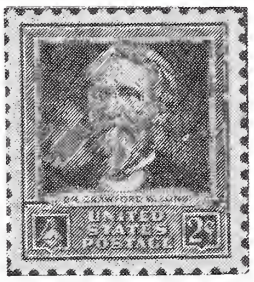
Physicians on United States Stamps

Elizabeth Blackwell, MD
First woman physician in the United States.
[United States, 1974,Scott #1399]
Born: February 3, 1821, Bristol, England
Died: May 31, 1910, Hastings, England

Harvey Williams Cushing, MD
Devised techniques and improved operative procedures for brain tumors that greatly reduced mortality rates from almost 100% to less than 10%.
[United States, 1986-93, Scott #2188]
Born: April 8, 1869, Cleveland, Ohio
Died: October 6, 1939, New Haven, Connecticut

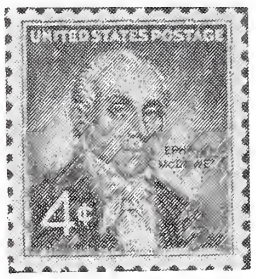
Charles Richard Drew, MD
A major contributor to the development of blood transfusions.
[United States, 1980-5, Scott #1865]
Born: June 3, 1904, Washington, DC
Died: April 1, 1950, near Burlington, North Carolina

Crawford Long, MD
First to use anesthesia.
[United States, 1940, Scott #875]
Born: November 1, 1815, Danesville, Georgia
Died: June 16, 1878, Atlanta, Georgia



William James Mayo, MD
Co-founder of the Mayo Clinic.
[United States, 1964, Scott #1251]
Born: June 29, 1861, Le Seur, Minnesota
Died: July 28, 1939, Rochester, Minnesota

Charles Horace Mayo, MD
Co-founder of the Mayo Clinic.
[United States, 1964, Scott #1251]
Born: June 19, 1865, Le Seur, Minnesota
Died: May 26, 1939, Rochester, Minnesota



Ephraim McDowell, MD
The father of ovariotomy.
[United States, 1959, Scott #1138]
Born: 1771, Rockbridge County, Virginia
Died: 1820, Danville, Kentucky

George N. Papanicolaou, MD
Developed cytological diagnosis for cancer.
[United States, 1978, Scott #1754]
Born: May 18, 1883, Coumi, Greece
Died: February 19, 1962, Miami, Florida

Walter Reed, MD
Proved the mode of infection of yellow fever.
[United States, 1940, Scott #877]
Born: September 13, 1851, Gloucester County, Virginia
Died: November 23, 1902, Washington, DC

Mary Edwards Walker, MD
Recipient of the Medal of Honor in 1865 for her exemplary service during the Civil War. It was revoked in 1917, and restored in 1977.
[United States, 1922, Scott #2013]
Born: November 27, 1832
Died: February 21, 1919, Oswego, New York

Paul Dudley White, MD
Known as the "Father of Heart Disease Treatment" in the United States.
[United States, 1986, Scott #2170]
Born: June 6, 1886, Boston, Massachusetts
Died: October 31, 1973, Boston, Massachusetts

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THE RHODE ISLAND MEDICAL JOURNAL

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Ninety Years Ago

[December, 1907]

James Franklin Collins, a professor of botany at Brown University, presents a detailed paper on the life and scientific contributions of Karl von Linne, better known as Carolus Linnaeus. Karl was born in Sweden in 1707, the son of a minister. His interest in botany, more accurately his passion for botany, began at a very early age. Rather than enter the ministry, as was planned by his father, he chose to study medicine at Upsala University, receiving his MD degree at Leyden in Holland. Linnaeus returned to Sweden, becoming a surgeon to the Admiralty and a professor at Upsala. In Collins' words: "It is said that there are few series of publications by any one man which show a clearness of treatment and intelligent presentation of the subject of natural history as do those of Linnaeus. He was the first to establish a system by which all plants might be readily classified. It brought order out of chaos. It is the only method which is in use at the present time. It is commonly spoken of as the binomial system."

Richard F. O'Neil, MD, remarks on nephrolithiasis, summarizing the physical and chemical characteristics of calculi, their etiology, classification, diagnostic characteristics and prognosis.

John E. Donley, MD, discusses the role of Dr. John Riolan in the 17th century controvery over William Harvey's contention of a coherent and uninterrupted flow of blood through the heart, lungs and viscera. Riolan was a contemporary of Harvey, and France's most distinguished physician. He was dean of the school of medicine in Paris and physician to Henry IV. Riolan's views, published in a 1649 text, may be summarized as follows: First, in health, there is no circulation through the lungs; second, the blood in the abdomen does not circulate; third, the only blood which circulates is found in the limbs; and lastly, blood in the right ventricle passes into the left ventricle by means of invisible pores within the interventricular septum. Needless to say, Harvey's views prevailed. [Riolan was an outstanding anatomist but failed to demonstrate these hypothetical pores within the septum]

Charles V. Chapin, MD, Superintendent of Health, summarizes the public health data of August and September 1907. There were 32 cases of typhoid [with 7 deaths]. 5.3 cases of scarlet fever [6 deaths], 48 cases of diphtheria [7 deaths]. The greatest single cause of death was diarrheal disease [157 deaths]. Two rabid dogs were identified during this interval. Those humans who were bitten received the customary Pasteur treatment.

Fifty Years Ago

[December, 1947]

William Buffum, MD, discusses the characteristics of asthma in infancy, concluding: "Each infant with asthma has many sensitivities both inhalant and food. It seems probable that infection seeks to increase the irritability of the bronchi and thus inititiates an attack in an individual who is already in an abnormal state dues to this allergy. An infection may also be superimposed on an already edematous bronchial mucous membrane and prolong an attack of asthma."

William D. White, MD, discusses various common skin diseases and their therapies. The author begins with scabies, which he considers the skin disease most commonly misdiagnosed. Impetigo and its infectious variants are next discussed. Acne vulgaris and the resulting cosmetic defects are carefully reviewed. Fungus diseases, including dermatophytosis, are considered. Tinea corporis and tinea capitis are next reviewed as well as pytiriasis rosea, contact dermatitis and alopecia areata.

Walter E. Campbell, MD, presents the case of a 30 year-old male with an acute, febrile illness associated with eosinophilia and a dramatic, short-lived psychosis. Various tests, including muscle biopsies, were consistent with a diagnosis of trichinosis. The patient steadily improved on conservative therapy.

Twenty Five Years Ago

[December, 1972]

Geographic changes in the sites of Rhode Island's medical practices, between 1950 and 1965, are analyzed by Robert J. Sullivan, from the Geography Department, Rhode Island College. He notes, first, that the automobile created a new mobility for many American families, permitting them to live beyond the inner cities while still being able to make use of urban facilities. In Rhode Island, for example, the number of passenger cars was 194,423 in 1950, but increased dramatically to 334,092 in 1965. His paper asssessed locational changes in private medical practices during this same interval. In contrast to the movement away from urban concentrations, medical practices tended to remain concentrated in the state's four principal regional centers: Providence, Woonsocket, Newport, and Westerly. Physicians stated that proximity to the hospitals and diagnostic facilities demanded that they stay where they were despite difficulties in parking and traffic congestion. The author concludes: "In the decades ahead, it is possible that hospital facilities of the intermediate centers and elsewhere in the suburbs will grow more rapidly than those of the state's principal regional centers."

Robert D. Coli, MD, William R. Thompson, MD, Walter Thayer Jr., MD, and Henry T. Randall, MD, describe the use of a partial ileal bypass in the management of familial Type II hyperlipoproteinemia and other reasons why this procedure may be justified in familial Type II heterozygotes and young homozygotes.

The *Journal* begins a brief column to summarize news on medical education, stemming from the newly-assembled MD program at Brown University. The first of these periodic columns describes the accreditation granted to Brown by the Liaison Committee on Medical Education, allowing the University to educate a class of 60 students per year for the MD degree.

3152

A Pro talks about Managed Care Liability

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On education: *"We're not seeing come true the fears that Managed Care cost-cutting would mean substandard care. However, we've always taken a proactive approach in educating our practitioners on the need to advocate for the patient. I think we've played a role in minimizing these problems."*

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